THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. XCI. No. 2210.] LONDON, SEPTEMBER 19, 1905. [57TH YEAR. PRICE 6d.

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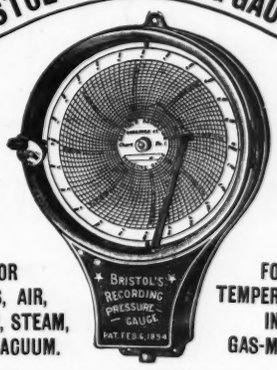

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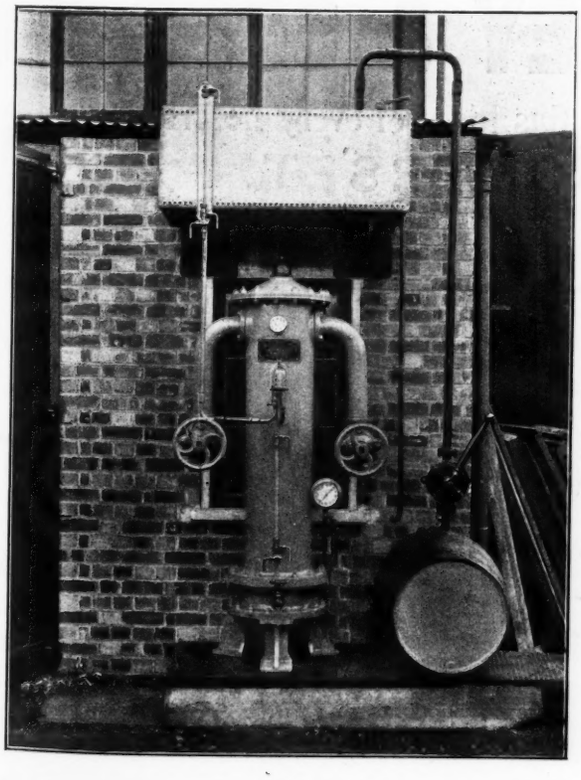

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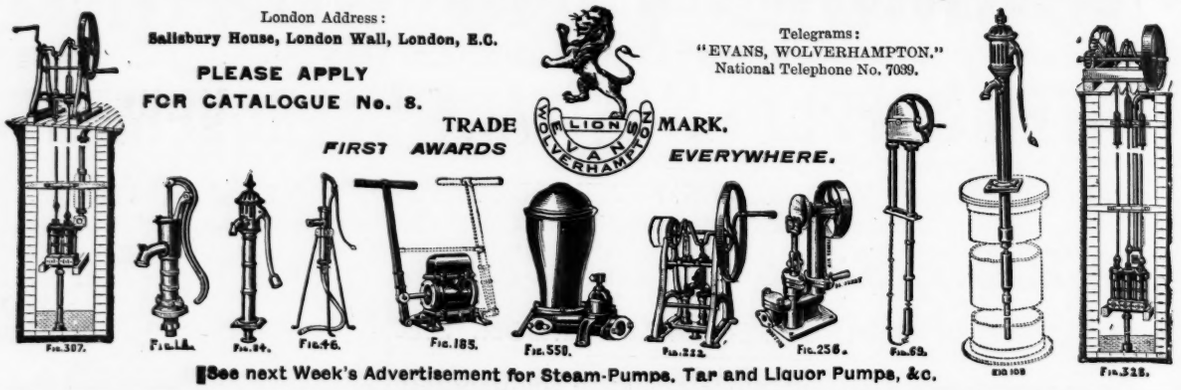

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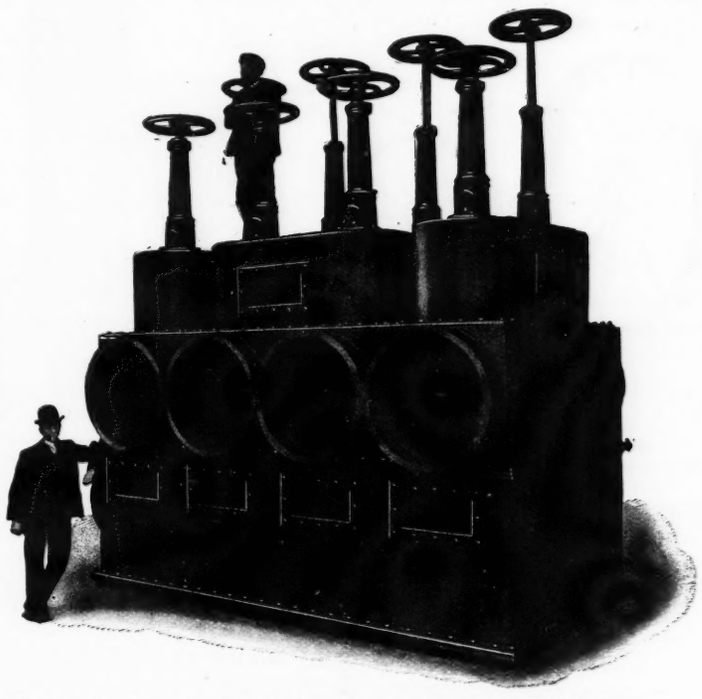

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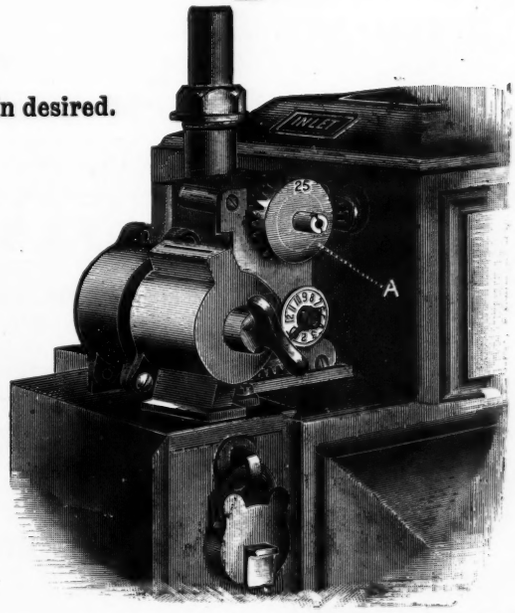

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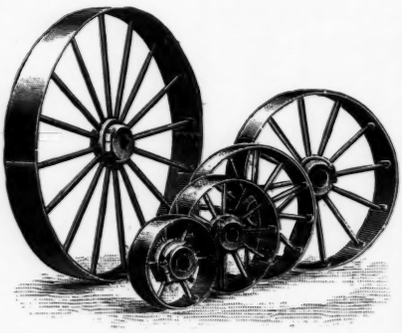

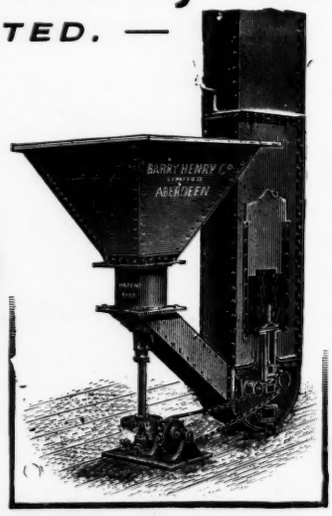

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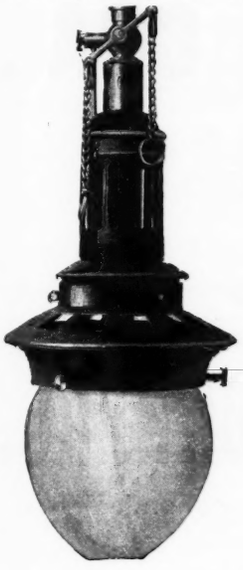

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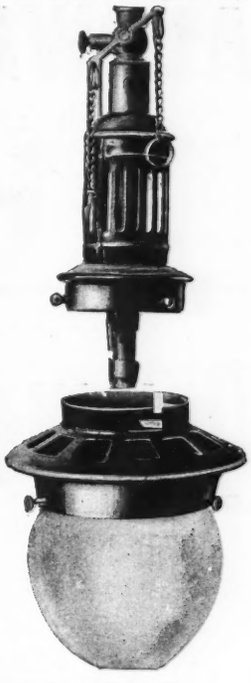

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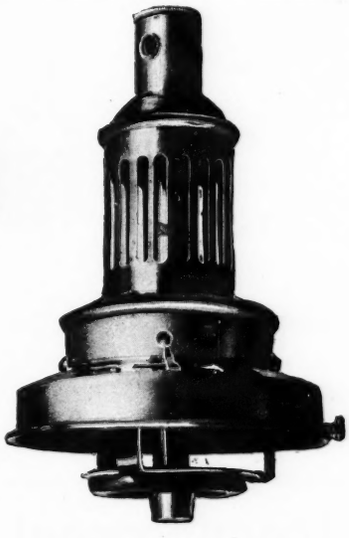

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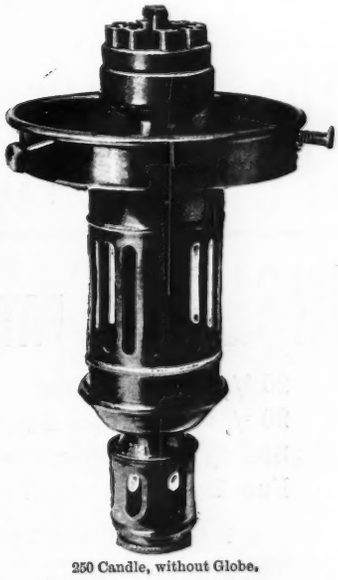

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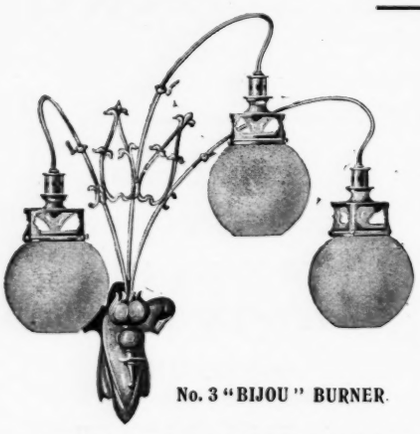

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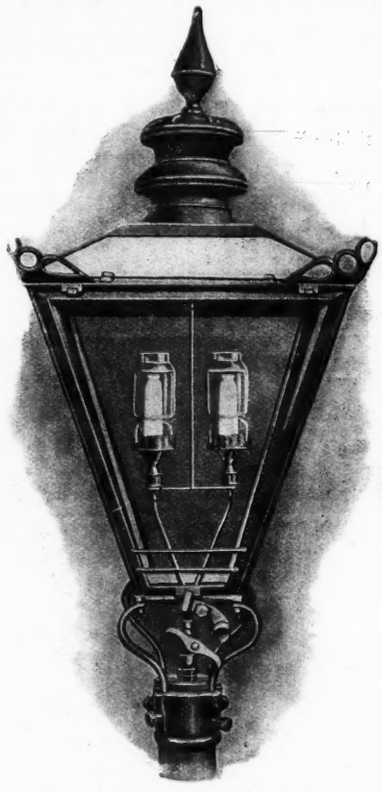

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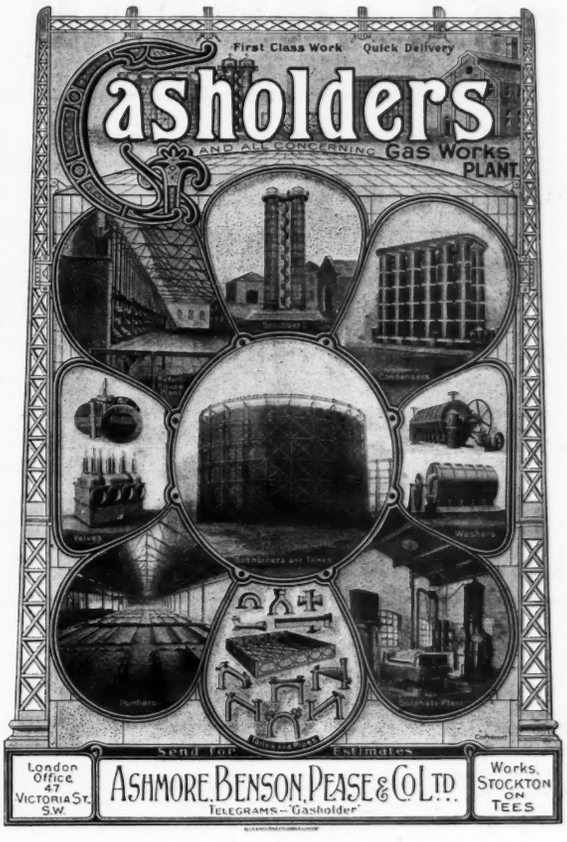
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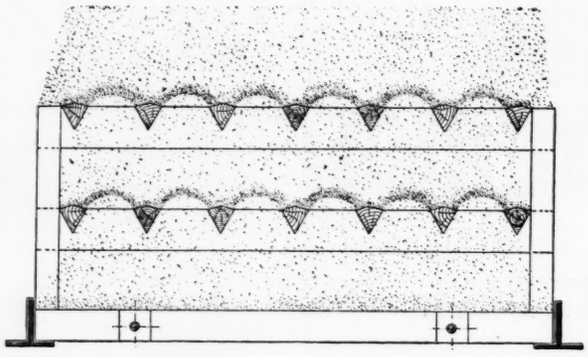

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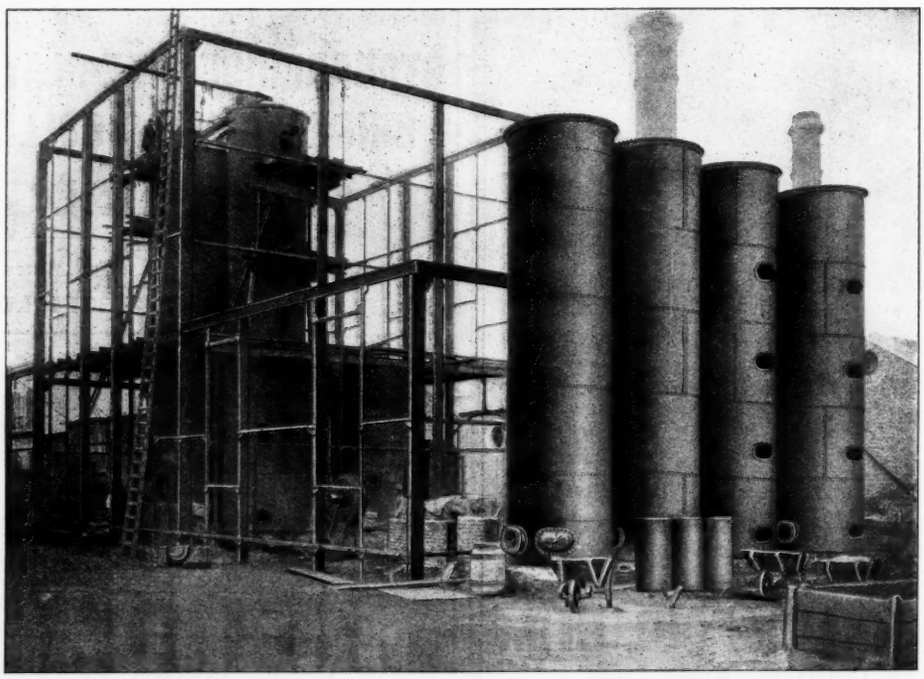

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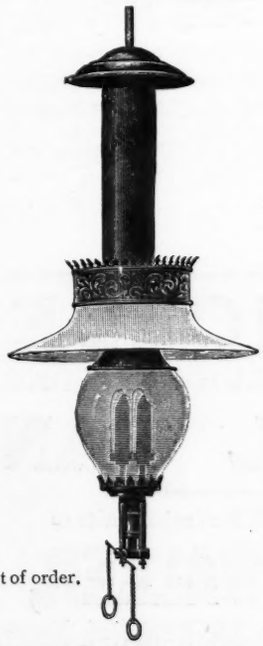

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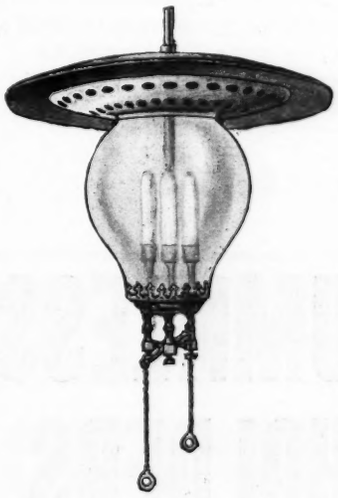

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IT CIRCULATES HYGIENIC HOT AIR,

And it is Recognized by the following qualities:

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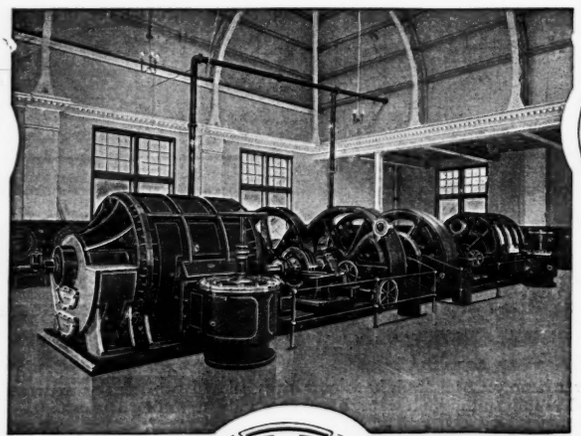

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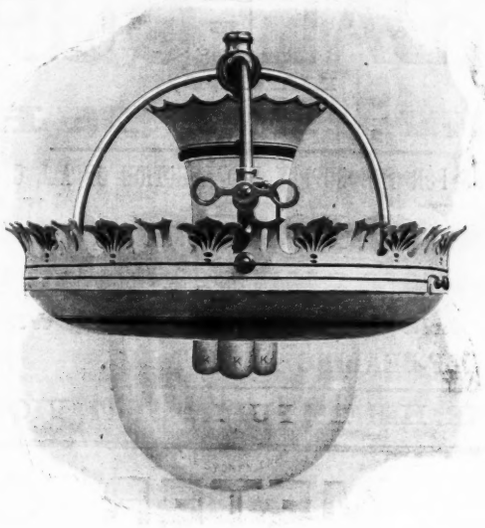

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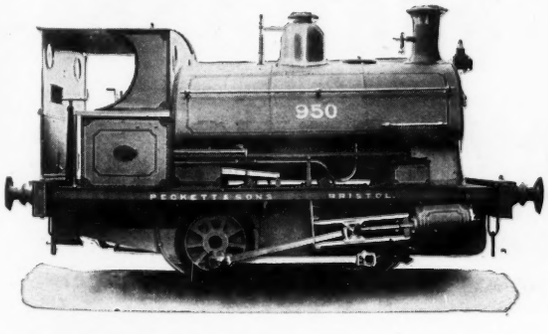

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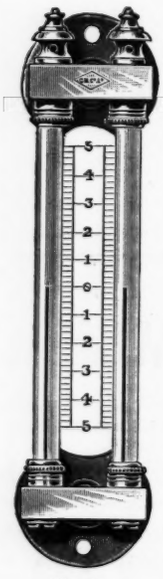

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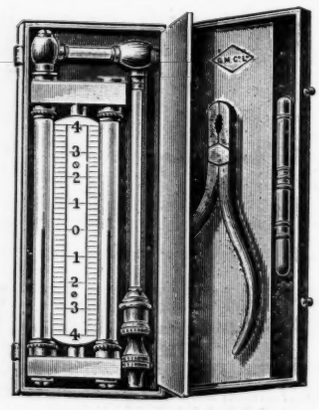

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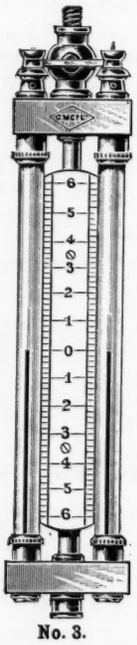

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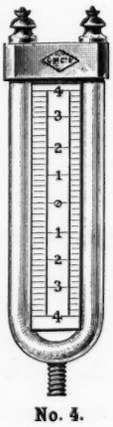

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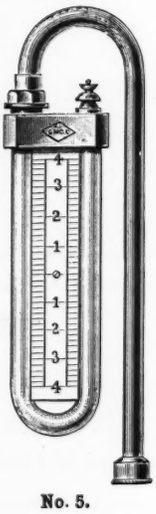

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CONTENTS.

EDITORIAL NOTES.

GAS, &c.—

An Answer to the Croydon Public Electric Street Lighting Report 735
The Commercial Side 736
Regulations for the Use of Gas-Stoves . . 736
Coming Events at Stockport—A Well Rewarded Effort at Newcastle—A Proposed International Acetylene Committee . . 737

Gas Stock and Share Market 738
Electric Lighting Memoranda 738
Wages and Hours of Labour in 1904 . . . 739
An Interesting Scheme of Works Reconstruction at Norwich 740
The Student's Lot. 749
Oxide of Iron as a Purifying Agent. By H. Leicester Greville, F.I.C., F.C.S. . . . 750
Commercialism at Gas Associations' Conventions. By Lucius S. Bigelow 751
Hygienic Essentials in Gas-Fires 752
The Kettering Water-Works 754

REGISTER OF PATENTS.

Governors for Gas-Burners—Child, J. F., and Francis, A. S. 755
Regulating the Seal of Hydraulic Mains—Johnston, A. A. 755
Gas-Governors—Ashworth, J. J., Wyke, J. H., and Pilling, G. H. 755

REGISTER OF PATENTS (*continued*)—

Gas-Meters—Clark, W. (Heirs of E. Haas) . 755
Valves Connected with Hydraulic Mains—Redman, T. 756
Intermittent Gas-Lighting—Gilbert, E. W. . 756
Working Turbines Operated by the Combustion of Gases—Gasmotoren-Fabrik Deutz 756
Incandescent Media for Lighting Purposes—Langhans, R. 756
Patent Notices 757

MISCELLANEOUS NEWS.

Gas *v.* Electricity for Street Lighting—The Proposed Croydon Experiment 757
Sheffield United Gaslight Company . . . 760
Ottoman Gas Company, Limited 760
Depth of Gas-Mains in Wandsworth . . . 761
Up-to-Date Gas Appliances at Newcastle. . 761
The Explosion at South Shields Gas-Works 763
Stockport Corporation Gas Supply . . . 763
Fatality at the Carcassone Gas-Works . . 763
Sale of the Halifax Tar-Works 764
Dear and Unprofitable Electricity at Faversham 764
The Worthing Gas Company's Extension Scheme 764
Gas-Works Extensions at Honley 764
Gas-Works Results at Conway 765
The German Incandescent Gaslight Company 765
Fatality at the East Greenwich Gas-Works . 765
Electric Lighting in Paris 765
Notes from Scotland 767

MISCELLANEOUS NEWS (*continued*)—

Current Sales of Gas Products 768
Coal Trade Reports 769
Stock and Share List 772

PARAGRAPHS.

"Gas Manufacture" Classes at Liverpool . 748
Personal 749
Obituary. 750
North of England Gas Managers' Association—Eastern Counties Gas Managers' Association 750
Re-instating Trenches at Battersea . . . 757
Bolton Gas Workers' Dispute 762
Leakage at Pontypridd—Reduction in Price at East Ham. 769
The Expenditure on the Rhyl Water-Works—Ossett and the Electric Light—Wages of Plumbers at Birkenhead—Charge of Extinguishing a Public Lamp—Quality of the Water in the Chelmsford District—Quality of the Gas Supply at Fratton. 770
Improved Gas Lighting at Deptford—Sulphur in Wandsworth Gas—Blackburn Town Council and their Gas-Fitters—Birkenhead Gas-Works Extension Scheme—Prosperity of the Wexford Gas Company—Falmouth Gas Company—A Plea for the Southport Gas Workers. 771
A Bogus Gas Inspector at Ipswich—A Medical Officer of Health on Mond Gas—Shortcomings of Electricity at Taunton—Sale of Ipswich Gas Stock—The Keith Light by Night 772

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VOL. XCI., No. 2210.—TUESDAY, SEPTEMBER 19, 1905.

EDITORIAL NOTES—GAS, &c.

An Answer to the Croydon Electric Street Lighting Report.

A THOROUGH and categorical reply has been jointly made by the South Suburban and Croydon Gas Companies, through their respective Secretaries (Mr. Charles M. Ohren and Mr. W. W. Topley), to the specious report on public lighting by the Electricity Committee of the Croydon Corporation. It is published to-day, with the essential portions of the original report, in our "Miscellaneous News." We have at various times dealt with the obvious weaknesses and imperfections of that report; but there were many matters that could only be adequately treated from the inner knowledge of the Gas Companies who are supplying in the district, though much of the same knowledge was already available to the Corporation if only they were technically qualified to apply it. The amount of circulation that the electricity report has had in the country, and the rapturous approbation it has received in the electrical press, has invested it with all the glory of a *magnum opus*. But if the electrical and the provincial papers which have found in the report consolation and fragile and equivocal argument in support of the public lighting extravagance of many municipalities, will only give equivalent publicity to the Gas Companies' cogent reply, the glory—alas!—will, we believe, quickly vanish. The charge of ambiguity and omission we have levelled against the Electric Lighting Committee's report cannot with truth be repeated by our electrical contemporaries against the Companies' answer. But now if they and the Croydon Corporation really desire the truth, and our contemporaries will support and the Corporation will allow, the Gas Companies interested will make, without cost to the rates, the practical experimental demonstration that they suggest in suitable positions in the borough—the demonstration to be with ordinary or high-pressure incandescent lighting, or both, "with or without a limit of price per mile of "street, and in a manner which, if adopted by the Council, "would represent to the ratepayers an annual saving equal "to at least a rate of 1d. in the pound, and which, it is "contended, would compare favourably with the present "electric arc lighting."

The penny in the pound is one of the important considerations that the Croydon Corporation cannot afford to overlook; for they, like many other local authorities, have not been exempt from the "bitter cry" of overburdened ratepayers. On the other hand, by adopting the Electricity Committee's proposal for extending the electric lighting, the prospect is that, instead of a penny being saved, another penny will have to be added to the rates; so that practically the difference between the Gas Companies' and the Electricity Committee's proposals is a twopenny rate. We should, however, like to see the experiment go farther than that suggested; and the advantage and importance would be not only local but universal. We put it to the Corporation that it is their duty to test the matter as trustees of the public interests. The Gas Companies, by their report, stand in the position of challengers, with or without, as the Corporation desire, stipulation as to the quotation of a price per mile or otherwise. Thus, so far as they are concerned, there would be ready compliance with the test we suggest. Let the Gas Companies instal in certain lengths of street what they regard as suitable and efficient systems for their lighting, and name a price for such lighting, at per mile; and then let the Electricity Committee in other parts of the same thoroughfares demonstrate what they are prepared to do at the *same cost per mile*, with, for the valuable information it would afford, in both cases—electricity and gas—a detailed record of consumptions, labour, cost of maintenance, and so forth. The latter details, of course, would have no effect on the price quoted by the Gas Companies; but the information would enable all interested to judge of the fairness of the respective charges—for we do hold that it is quite as unjust to ordinary consumers of gas or electricity to charge an unremunerative price for public lighting, as it is that municipalities should, for the maintenance of their electricity undertakings, make the ratepayers pay an inordinate sum of money for unnecessary and lavish illumination in the streets. The eyes of the public and of the Corporation would be sufficient to judge of the relative lighting effect offered at the corresponding prices per mile. This practical test would do away with all the ambiguity, incomprehensibleness, and incompleteness with which the Croydon Electricity Committee and other supporters of electric public lighting elsewhere seek to distract the public as well as the members of local authorities. That such a comparative test is desirable is shown by the exposure, in the reply of the South Suburban and Croydon Gas Companies, of the absurdity underlying the seductive figures of the Electric Lighting Committee. There is a satirical note running through the fifth paragraph from the end of the Companies' reply; and the argument is so plainly put that the meanest intelligence cannot fail to see the absurdity of the situation which the Corporation Committee have created for themselves. Just one extract—

> What is the use of a comparison of costs based on candle power per annum, when, according to the figures given, to effectively light the streets by one kind of lamp [electric arcs], 10,000 candles must be provided per mile against 800 with the other. Things that differ to such an extent cannot be compared by saying that the extravagant one costs only 11·328d., while the enormously cheaper one costs 15·862d. per candle power per annum. . . . No man in his senses would think of buying 10,000 articles at 11d. each, when 800 of another kind at 15d. would answer his purpose.

These figures of the Electricity Committee supply the proof of the hollowness of their contention; and those which show that the cost of lighting 18 miles of streets electrically (£8313, including both sinking fund and interest) exceed by £1251 per annum the cost of lighting 127 miles by gas should be sufficient to determine the Corporation that the system of lighting recommended by the Electricity Committee is not "most satisfactory," nor that it is "in the "interests of the Corporation to keep the lighting of the "borough as far as possible in their own hands, and so re-"tain any advantage which may accrue through a larger "output of the Corporation electricity works," and through (the Committee must pardon us adding) the disadvantage of the ratepayers. The reasoning of the Electricity Committee lacks force and soundness; and it is inconceivable that any body of public men should seek, in this or any other manner, to justify waste from one hand and add to the weight carried by the long-suffering ratepayers, merely in order that the other hand may benefit by such procedure. The Gas Companies also correct several negligently made errors, and supply omissions, in the Electricity Committee's report—not the least significant of the latter being the comparison of the actual payments in 1904 per mile of lighting by incandescent gas-burners, Nernst electric lamps, and electric arcs. These, now that we have them, are worth attention. It is also shown how the figures of the Electricity Committee are vitiated by the fact that the hours of lighting by gas and electricity are altogether dissimilar.

In the light of the Gas Companies' plain statement, the Electricity Committee have much to explain away—if explanation be at all possible. It is a reply that they cannot ignore; and while they are meditating over their retort, readers will find a great deal that concerns them in the published documents. It is matter that should not be missed. What we would like to see above all things is that there should eventuate, from this Croydon controversy, a demonstration of the relative capabilities of gas and electricity at fixed and corresponding prices per mile. That would indeed be of immeasurable value in the general settlement of this much-vexed question.

The Commercial Side.

THE hoary maxim, which we of the gas industry, and our fathers before us, have held dear, that "dividends are made "or lost in the retort-house" must now be extended. This ought to have been recognized before; but the aphorism has, in its old form, so long held place in our affections, that the necessity of change has, it is feared, been overlooked. As it stands it implies that the retort-house is the only place in which dividends can be made or lost. This may have been sufficiently true in the past; but those were the days when the gas manager sat comfortably in his office, waited for business to turn up, and then dictated, by a series of cast-iron rules, the terms on which he would be prepared to yield to the wishes of those who desired to become consumers of his gas. Those, however, were not the best days in the prosperity of the gas industry; the best days have been those in which there has been competition, which has brought the gas manager from his shell, and compelled him personally to go out to meet the rivalry, or to direct the operations of those under him. The position is reversed. Instead of the customer going to the gas manager, it is the gas manager who must perforce go to the customer. Under the changed conditions, with the aid of invention, a magnificent prosperity has accrued; but the competition does not abate. It is keener and more extensive than ever; and so much so that it is quite possible that dividends may be made or lost not only in the retort-house, but in many a district. From the highest to the lowest of gas administrators comes the confession that they have now to do many things to retain custom, and to meet emergencies, that in a former day they would not for a moment have entertained.

We find evidences of the change in our gas organizations. Time was, and it is well within recollection, when in those organizations the science and the practice of the manufacture and distribution of gas up to the meter was considered an ample store from which to obtain pabulum for consideration and digestion. To then read a paper, or try to tempt a discussion on such a matter as the commercial relations between suppliers and consumers, meant a thinning off of those in attendance, and consideration (let us make a clean breast of the matter) on the part of the Editor of the "JOURNAL" whether it was worth while to devote space to the publication of the production of a man who essayed to promulgate such a piece of heresy as that any portion of a gas manager's business life should be occupied outside his office or works, or that his attention should be in the slightest respect divorced from the technical engagements of his position. Such attitude dates back many years; and now at the meetings of our organizations, as well as in the pages of the "JOURNAL," commercial questions rank equally with the technical. Not only so, but a Commercial Section to a District Association is already an institution, and there may soon be a second representative in another quarter; but these deal with the questions of purchase and sale of materials and goods more than those directly affecting the sale of gas. In the United States, things have gone a step farther; and the commercial district men of gas undertakings now have an Association of their own.

It was some time since that we noticed the proposal made by our contemporary, "Light," to bring together into such an organization the commercial or business men of the gas companies in the States; and through Mr. L. S. Bigelow, President of the "Light" Publishing Company, it is now learned that the Association has not only been established, but that it has developed splendidly, and enjoys the membership of the commercial officers of many of the largest gas companies in the States, as well as of those of a good proportion of smaller undertakings. Things are managed somewhat differently in this country in the conduct of the business of a gas company. Save in the more prominent concerns, where the work is divided into departments under one or (in those few cases that are the exceptions to the rule of one) two chiefs, the engineer is exclusively the commanding head in the management of works, production, and business. There is no division of responsibility, and therefore unless the assistants in the commercial departments were allowed to organize for purposes of discussing business-developing methods, imparting information as to the appliances found most popular in different districts, and so forth, there is little room here for emulating the National Commercial Gas Association which has been so promptly and successfully established in America, seeing that the responsible men are well provided for through their existing Associations. However, to the new Association in the States, we wish the greatest success.

More information on the subject will be found in a communication made, by Mr. Bigelow, to the Pacific Coast Gas Association. The paper is published in another part of this issue; and in it, it will be seen, a still further development is projected. It is that there should be one National Gas Engineers' Association, and one National Commercial Gas Association, and that the annual meetings should be held at the same place and in the same week, so that certain days could be set apart for joint conference on commercial matters alone. The scheme seems to be, under the conditions existing in the United States, a workable one; and from this reference to it, some useful hint may be drawn by those specially interested in the subject in this country. The spirit of commercialism in the ranks of a gas undertaking's staff must be cultivated to the utmost, and individual responsibility in respect of it be constantly encouraged. No gas undertaking can afford to ignore opportunity nowadays; and many opportunities may be lost without an efficient business staff. The gas engineer and manager feels the pressure of the new compared with the old times; but, in the discharge of his trust, he cannot afford to lose his grip over any one branch—manufacture, distribution, or business in the district. It is therefore essential that in every direction he should be well supported. In the case of most gas undertakings he is; and in those instances where he is not, the impressing upon Directors and Committees that profits can be made and lost in not only the retort-house but the district may have the proper effect. There is much to be defended, and much to be accomplished, on the commercial side of the industry; and all efforts on that side deserve every particle of the sympathetic assistance that can be given by those in supreme authority.

Regulations for the Use of Gas-Stoves.

REGULATION and prohibition have grown so greatly into the life of our Germanic cousins that now and again we come across one natural result—the proposal, and even the infliction, of rules that are nothing short of ridiculous. Mark Twain is not alone in having found amusement in a system of control carried on with almost the exactitude imposed by martial law. Regulation and prohibition are right enough when they contribute to the physical or the moral well-being of the people, and promote safety and prosperity; but there is little sense in prescribing and in dictating a course of action, unless it is first and completely endorsed by competent authority. In rules founded upon mere empiricism, there is danger—the danger of doing more harm than good, as, for example, in the prohibition of conveniences which may work a grievous injury to the community as well as to an industry. Dr. Schäfer, of the German Continental Gas Company, of Dessau, brought before the German Association at their last meeting a paper which discloses what (with all the seriousness it involves for the German gas industry) is a proposed code of rules, referring to the use of gas-stoves, which borders on the humorous.

The greater part of Dr. Schäfer's paper, in which he does not (and very rightly, his British readers will agree) deal gently with the proposals and their author, is published in another part of to-day's issue. This is a case in which the suggested rules are not, it is quite clear, the conception of competent authority. They first saw the light of day in a paper by Privy Councillor Professor Rietschel; and as this gentleman occupies an influential position, his words, even though they cover fads, carry great weight. In this country, where gas-stoves are universally recognized as one of the greatest, if not the greatest, of domestic conveniences that the age has given us, and the greatest contributors to relief from polluted atmospheres in our towns and cities, it would be regarded as an almost national calamity, and there would be at once a national protest, if freedom in their use was threatened by any such prohibition and regulation as that which Professor Rietschel has conceived as essential and proper. One of his suggested rules debars entirely the use of gas-stoves with non-luminous flames. Derision alone would kill such a notion in this country, where its adoption would mean the throwing on to the scrap heap of stoves by their thousands, in some cases many tens of thousands, in almost every city and town. The idea is one for ridicule, rather than for serious treatment—more especially as Professor Rietschel does not support it with a shred

of common-sense evidence, being content to justify himself with a few vague generalities. The prohibition referred to would only admit the use of stoves with luminous flames, which are not in general service as are non-luminous ones in this country; and even with luminous flame stoves, regulations as to the construction and position of the exit-flues are put forward as being absolutely necessary to ensure that health shall not be affected. These latter rules have received the support of the Editor of a German sanitary engineering paper, who would make their evasion or neglect by builders a penal offence. Dr. Schäfer subjects the proposals to poignant and destructive criticism.

In this country any contemplation of applying such regulations to gas-stoves would be considered too grotesque to warrant grave discussion; and we hope that the people of Germany and the gas industry of that country will never have to acknowledge that they are the victims of such unjustifiable restriction in the use of conveniences which properly applied (as every gas man knows how to apply them), tend to comfort and hygienic conditions. Perhaps, however, Dr. Schäfer has treated Professor Rietschel too gravely; for we cannot think that, even in Germany, such unreasonable restrictions would become law on the dogmatic assertion of any single person. But it seems that erroneous impression has before given birth to certain regulation (happily afterwards removed) in connection with the gas supply of certain German cities; and to this probably must be attributed the fear possessing Dr. Schäfer that a greater wrong may be done the industry through Professor Rietschel.

Coming Events at Stockport.

The report of Mr. S. Meunier, of Stockport, on last year's operations at the gas-works is of particular interest, foreshadowing as it does an alteration in the illuminating power of the gas supplied by the Corporation. The quality at present is something over 18 candles; so that there is room for some reduction, to bring the town into line with prevailing tendencies in regard to the illuminating power of gas. And Stockport is in a particularly favourable position to undertake such a change; for it is under no parliamentary restrictions whatever in this respect. In order to bring about the reduction, therefore, the only thing that is necessary is the confirmation by the Council of a recommendation to that effect by the Gas Committee. The issue of Mr Meunier's report gave rise to questions in the Town Council, the answers to which (as reported in last week's "JOURNAL") indicated that the Committee are seriously contemplating a move in the direction of a lower candle power and the extension of incandescent gas lighting. An objection that the incandescent system might not be suitable for use in the mills, on account of vibration, was met by the remark that these lights are already in use in a great number of mills; and this seemed to be the most important point raised on that occasion. Doubtless the matter will be more fully discussed when it comes formally before the Council; but there seems to be no reason why Stockport should not find a lower quality and cheaper price as advantageous as other places have already done. The particulars from Mr. Meunier's report which are published to-day show that he is fully alive to the necessity for selling gas at the lowest possible rate, in order to successfully fight competitors; and this fact should be noted with satisfaction by the citizens, both as ratepayers and as consumers. The charges in Stockport are already favourable—2s. 4d. per 1000 cubic feet within the borough, with discounts for trade purposes ranging up to 10d. per 1000 feet—but we shall be surprised if events prove that bottom has yet been reached in this respect.

Well Rewarded Effort at Newcastle.

We have devoted a considerable amount of space to-day—though not a line more than it deserves—to a meritorious effort which is being made by the Newcastle and Gateshead Gas Company to still further popularize the use of gas for the many purposes to which it is so admirably adapted. This is not the city's first experience of an exhibition on what may be termed comprehensive lines; but the present show is on an altogether larger scale than its predecessor of some two or three years ago. The plan adopted appears to be somewhat on the same lines as that which resulted so successfully at the Earl's Court International Gas Exhibition last winter. That is to say, the promoters are the Newcastle Exhibition Company, whose building has been utilized for the purpose; while the exhibits have been selected by, and the management is under, the supervision of an Advisory Committee appointed by the Gas Company. The work of deciding as to what should be shown must have been considerably augmented by the fact that, large as is the hall, it has proved not nearly big enough to provide space for all those who applied. This indicates the success that the scheme has been from an exhibitor's point of view; and judging from the reports so far received, there can be no doubt whatever that the exhibition has "caught on" with the public, and that there is thus every reason for congratulation all round. Of course, it goes without saying that the results achieved could not have been arrived at without a vast amount of hard work on the part of those responsible for the arrangements; and while it is abundantly clear that all concerned have done their best, we cannot but feel that a special meed of praise is due to Mr. John Lewis, the Distribution Superintendent of the Newcastle Gas Company. Mr. Lewis was Joint Manager with Mr. W. A. Cowie (of the Exhibition Company); and everything connected with the show bears evidence of his untiring work and skilful organization. Mention must also be made of the labours of Mr. Thomas Waddom, the Secretary of the Gas Company, who, as Chairman of the Advisory Committee, must, along with the other members, be largely responsible for the success that has been attained. It seems to us that the exhibition has been conceived and carried out entirely on right lines. All the latest gas appliances are on view; and, more than this, the attendance in large numbers of the general public has been assured by the provision of a first-class band, together with other attractions in the shape of cookery competitions and popular lectures on this and other subjects relating to the use of gas, delivered by those who know how to make what they have to say interesting. Sir William H. Stephenson, the Chairman of the Gas Company, when formally opening the exhibition, referred with pride to the prosperity of the undertaking and the continuous growth of the output of gas. It would be strange indeed if the Company did not prosper, seeing the enterprising manner in which its affairs are administered, and the soundness of the business in which it is engaged.

A Proposed International Acetylene Committee.

It seems that there is at any rate some sort of a possibility of an international body being formed for the purpose of furthering the interests of the acetylene industry by a satisfactory settlement of the various problems by which it is at present assailed. The meetings of the Acetylene Association whose headquarters are in London have shown that, as is only to be expected in the case of a business which has so lately sprung into prominence, there are many matters of a commercial nature—apart altogether from the technical side—which need much adjusting. Apparently similar bodies in other countries have found themselves confronted with difficulties of the same kind; for these, as well as scientific points, are to be considered by the Committee. The subject is dealt with in an article in the current number of the "Ironmonger;" and we gather from this that the idea is to institute a standing international expert committee to deal with such questions as affect the industry as a whole. The matter was brought before the International Acetylene Congress held recently at Liége; the outcome being a decision that such a Committee should be formed, to remain in existence until the next International Congress. Until then the French Association will provide office-room, funds, and officials; and the existing Acetylene Associations will be asked to nominate members to join the Committee. Among the unsolved problems of a technical and commercial nature which it is stated that it will be the duty of the Committee to investigate, or to instruct experts to investigate, are the following: The maximum quantity and the nature of the impurities which may be safely present in calcium carbide of merchantable quality, the rules imposed on carbide makers or dealers by shipping firms in different countries for the packing of carbide for exportation, and the place and date of the next International Congress. So long as the matters considered by the Committee are such as apply equally to all countries, something may result from the proposal; but we are inclined to agree with our contemporary that where this is not the case, joint action between the several Associations is hardly likely to have any good effect. The scheme must, of course, be regarded as being very largely in the nature of an experiment; and if the deliberations of the Committee result in setting at rest even a few of the outstanding questions, their labours will not have been in vain.

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 772.)

A CHANGE has come over the Stock Exchange during the past week, owing to the uncertainty of the monetary situation. A rumour was circulated that over a million sterling was to be taken from the Bank of England for shipment to the United States; and though the report proved incorrect, it has had the effect of checking fresh business, for it is feared that the Bank rate will be raised to 4 per cent. before long. Gold was taken from the Bank on Saturday for South America, and it is known that Egypt may also take some this autumn; so that discount rates have hardened up to within a fraction of the Bank rate, while rates for loans are also stiffer. The Settlement, which occupied attention during the greater part of the week, proved to be much heavier than for a long time past; and with the banks charging 3¼ to 3½ per cent. for fortnightly loans, the continuation rates were stiffer. Although there has been a good deal of liquidating sales since the Settlement was concluded, and a decline in prices, yet the undertone continues good, and the hopeful feeling as regards the future still exists; for it is felt that, even with dearer money, business is likely to be good with the political horizon clear. It is the uncertainty which has created a lull, and caused Consols and other gilt-edged stocks to decline. Gas stocks have also been extremely quiet, but they have all well maintained their values; while some half-a-dozen stocks are quoted at an advance. The most dealings were, as usual, in Gaslight ordinary, between 99⅝ and 100¼; while some stock changed hands for cash at 99 during the Settlement. There was nothing done in preference or debenture, except the maximum 3½ per cent., which sold for cash at 92½. Commercial ordinary was supported, and improved to 120; while the 3½ per cent. are also better at 113 to 115. Business was done in the latter stock at 113½ and 113. South Metropolitan has been inquired for, though there is no quotable change in price. A good deal of business was recorded on Saturday; the official markings ranging from 133¼ up to 134. Previous to that business was done at 133; so the trend of the market is upwards. The debentures changed hands at 89¾. The Suburban and Provincial group have been very quiet. Tottenham "B" stock met with some attention, and official markings are recorded at 97, 97½, and 98¼. West Ham ordinary also changed hands at 104. As regards Provincial stocks, Liverpool "A" has been advanced to 224-226, and the "B" stock to 168-170. The Brighton and Hove issues, and Hastings and St. Leonards, are quoted *ex div.* The Continental group also showed firmness. Imperial Continental has advanced to 217-20; and Continental Union to 117-20. The ordinary stock of the latter was bought at 118, and that of the Imperial Company at 216½ up to 218. European changed hands at 23½, Tuscan at 10, and Ottoman, which is now quoted, *ex div.*, 6⅜. As to undertakings in more distant parts, Cape Town ordinary changed hands at 17 1/16 and 17¼, and Metropolitan of Melbourne at 103; while business was done in Bombay at 6 1/16 for cash, and 6 5/16 and 6⅞ for the new account. For River Plate, 13¾ was obtained for cash, and 13⅜ and 13½ for the account. Business was also done in Monte Video at 12¼ and 12⅛, Buenos Ayres at 12⅞, Primitiva ordinary at 6¾, and in the debentures at 98¾ and 99.

ELECTRIC LIGHTING MEMORANDA.

The Bermondsey Borough Council Pilloried—The Maintenance of Electricity Undertakings by Subsidiary Agencies—"Fear" or "Weariness"—The Opportuneness of the Croydon Report—A Point regarding Purchase—An Electricity Scheme for Irvine.

BERMONDSEY has a peculiar interest for gas people, because it was that borough of London that, through the South Metropolitan Gas Company, gave name to the clause (subsequently expanded in its effect by the Northumberland version) that was the stepping-stone to the protection of the public in connection with trading in electricity by municipal authorities. It was not long after Parliament allowed the clause, that it was found it still left openings through which the Borough Council could make the ratepayers pay for their particular fancy. We have on several occasions commented on the matter—showing how, through the public lighting and consequently the ratepayers, the Council have succeeded in making what is called a "profit" from their undertaking. But it now transpires that this criticism only covers part of the story. A letter, signed "H. C. S.," and headed "Costly Municipal Enterprise in Bermondsey," appeared in the Commercial Supplement of "The Times" last week. In this, the writer produces figures which show how necessary it is, in dealing with the actual cost to the ratepayers of a municipal electric lighting undertaking, to consider the subsidiary agencies which are brought into existence for the sole purpose of its maintenance, and also the increased cost over those agencies which it displaces. The writer deals out his points with a directness that has no doubt caused agitation within the municipal circle, which has already been much perturbed by the unyielding activity, in this direction, of the local Ratepayers' Association. In the first place, conjointly with the electric light works, a dust destructor was established, though (Bermondsey being situated on the banks of the Thames) the cost of barging away the refuse was formerly very low—1s. 2d. a ton, and, with increased wages it might now amount to 2s. It was estimated that the cost of disposing of the refuse by means of a destructor would be 4d. per ton; it actually works out to 7s. 4d. Let us reproduce the estimates and the result of the working of the destructor for the year ended March, 1904, as produced by "H. C. S.," for they are instructive:—

	Estimate.	Actual Results.
Capital cost	£10,000 0 0	£25,855 0 0
Maintenance	1,359 0 0	5,675 8 1¾
Revenue	1,170 0 0	886 12 4
Net cost for the year	1,893 0 0	4,788 15 9¾
Cost of destroying refuse per ton	0 0 4	0 7 4

What more need be said on this head to show how visionary were the claims for the destructor, and how this subsidiary agent to the electricity undertaking has brought a great disadvantage upon the ratepayers.

How easily the Council have evaded the principle of the Bermondsey clause, and how easy it is to make a profit when the ratepayers are forced to find the money, are shown by the division of the current sold in the past year between the private consumers and the public lamps. Private consumers took 545,847 units; and municipal institutions and public lighting (charged against the ratepayers), 387,480 units—a balance of 107,399 units being unproductive or unaccounted for. The sale to the private consumers, says "H. C. S.," results in a loss; the expenditure exceeding the income by £308. On the other hand, for the supply of the municipal institutions and for street lighting, "the undertakers charge the general fund of the Council with an amount which (taking all loans into account) realizes a profit over and above £1000." If the Council can, it is remarked, regulate the price paid by the rates when and if the beneficial source of revenue results in a loss, it is clear that the rates are used to meet the deficits of the undertaking. So the intention of Parliament is defied. From the year 1902, the entire cost of the arc lamps, maintenance, law charges, opposition to Bills, &c., have all been charged against the general fund. Of course, we agree that it would not be fair to debit the electric undertaking with the entire provision of the lamps and the whole cost of maintenance; but surely, as "The Times" correspondent contends, the difference between the cost of fulfilling a municipal obligation and an excessive expenditure should in justice be debited to the undertaking causing the excess. There is much more of the same kind in the letter; but, in large part, it has been fairly well comprehended by articles in which Bermondsey has furnished lurid illustration of practices that press so hardly upon ratepayers through the municipal propensity for speculation, and the ready manner that councillors fall into traps mainly set for those whose judgment is not founded on technical knowledge or experience.

The Croydon Corporation Electricity Committee have gained a certain amount of notoriety by their recent report, which is referred to elsewhere in this issue; but this must be rather on account of its boldness than its veracity or conclusiveness. Is it "fear" or "weariness" that makes other electricians grasp at the Croydon report like a wrecked man at a spar? We are asked to believe by an electrical contemporary that "weariness" alone is the reason that electricians refrain from attacking the question of the relative costs of incandescent gas lighting and electricity. We cannot really believe it. Is it to be understood that they so quickly suffer exhaustion, that they must needs, instead of fighting on their own account, fall back wearily on the Croydon report? Our own impression, under the circumstances, is that the alternative of "fear" given by our contemporary is at the bottom of the disinclination to contradict by figured argument. The Croydon report is finding its way, or portions of it, into several provincial newspapers; and as the electrician posts it to the local editor, it is no doubt with a secret expression of thanksgiving that the responsibility for all the statements in it are not his to justify. The act savours of cowardice, fear, or inability. The "Preston Argus" has taken a great deal of freedom with the report by extracting from it liberally and paraphrasing portions, and so serving it up in the shape of a leading article. This is intended to assist in turning Preston councillors who are wavering as to which—the electric or the economical incandescent gas lighting—stool they shall sit upon in the matter of clearing from the streets a small amount of electric arc lighting over which the Council admit that they have not had the most agreeable of experiences. Why the Preston electricians should have to fly to the Croydon report for aid in trying to save the situation, we do not precisely know, but are at liberty to draw our own inference. However, we hope that the Preston councillors will not be swayed by such flimsy reasoning as is to be found in the report, without very carefully learning what there is to be said on the other side. The "Preston Argus" and the Electric Lighting Company, now that a serious proposal is being made to banish electricity from the streets of the town—complaints having extended over some years—are raising the parrot-like cry of the arc lamps being "old-fashioned." This was the cry in the City of London. But neither in the City nor Preston do the Companies seem to appreciate how this reflects upon them, when complaint after complaint of dissatisfaction with the lighting has been made. Three or four years ago, the Electric Light Company of Preston had a chance of showing what could be done when they erected some three or four special lamps near the new Post Office and the Sessions Hall. Did these lamps do better than those it is

proposed to discard? The question is not perhaps to the point. The real point is that the Electric Light Company were under contract to give the Corporation a light of 1000-candle power from each arc lamp; but, according to the statement by Alderman Pearson, the Chairman of the Streets Committee, at the recent meeting of the Council, the lamps only gave an average illuminating power in the neighbourhood of 400 candles. Therefore, the inquiry may be put to the ratepayers and the Council, Does the fact that the Company's lamps are old-fashioned justify the Corporation in paying for six-tenths less light than they are entitled to under their contract? The ratepayers and the Council may answer the question. It is usual for a Corporation, like an individual, to see that they get value for money; and what is the good of a contract if one side is to be at liberty to violate the bargain in this way? "Let there be Light" the electricity-smitten writer in the "Argus" placed at the top of his "leader." To it, we fervently say "Amen."

The attitude taken up by the "Preston Argus" raises another question. This paper, with the wisdom characterizing so many other papers which touch questions that are not understood by the writers, has proposed that the Corporation should buy the National Electric Supply Company's undertaking. We are obliged to the "Argus" for making the suggestion, because it gives the opportunity for saying that the "Argus" writer is a sample of the advocate who never considers anything but whether a Company is paying well or not when the question of municipalization is advanced. The Preston Company we find obtained their Provisional Order in 1891. The General Electric Lighting Act of 1888 enables the Corporation to purchase at the end of 42 years at the mere market value of the lands, buildings, works, material, and plant, "without any addition in respect of compulsory purchase, or of goodwill, or of any profits." Fourteen years have passed over the head of the Company; leaving only 28 years to run, before the Council can do as they please with them. Under these circumstances, a considerable percentage of the Company's capital should have been wiped off in the form of depreciation; but beyond the formation expenses, the last accounts that we have before us (submitted to the shareholders in February of last year) show that the Company have only £10,756 set aside to depreciation and reserve accounts combined. This, after fourteen years, or one-third of the Company's statutory lifetime! The capital expenditure at the same date was £143,668, so that though one-third of the 42 years had then flown, the Company had only set aside about one-fourteenth of their capital expenditure, and only part of that specially for depreciation. This is a feature in the question of purchase that shareholders in Electric Lighting Companies should consider, seeing that the time will come when the local authority will have the right to purchase at merely the then existing value of the plant. On the other hand, if there has been insufficient depreciation, a local authority purchasing before the 42 years must also be affected. If the purchase advocate of the "Argus" will reconsider the question in the light of what is said here, he may revise his opinion, in the interests of ratepayers and shareholders alike.

Caution is a quality of which our Scotch friends are proud; and upon the question of electricity supply, it may be supposed they bring that quality to bear. A long discussion at a meeting of the Irvine Town Council has aroused in us a suspicion that there comes a stage when, even with the exercise of caution, our friends across the Border may lose their way, or that, in following one direction with excessive care and zeal, they may be blind to the fact that the way pursued may not be the only one that should receive their attention, nor the best one. Not all the members of the Irvine Town Council come under this criticism in the matter that we have in hand, but certainly it applies to a goodly proportion of them. Caution has caused the Council to allow a Committee to have the subject of adopting an electricity supply scheme under their consideration for the past twelve months; and before that the matter was in the hands of the Burgh Commissioners in Committee. The original estimate for an installation was not far short of £11,000; and the Council and their Committee correctly feared that in Irvine this expenditure would cause the charges for electricity to be on such a scale that the thing would never pay. But electrical consulting engineers are very accommodating. Their process seems to be to present a fairly costly scheme. We may be told this is only a bit of human nature; it is a big bit. Like the dealer in antiquities, they keep a substantial margin in hand, from which they can lop off pieces here and there when they get some idea of their clients' views as to what they consider the price they can afford. It is a little to the discredit of the Irvine Town Council and their native characteristic that, having shown such great caution up to a point, they do not appear to have been struck by the peculiarity that, when they first consulted a firm of experts, a scheme was presented to cost a certain large figure, but that, when there was a chance of the project collapsing, another scheme was forthcoming that is to cost £4000 less, or £6646 15s. The councillors might well ask why the experts did not tell them of this cheaper plan before. Irvine is not a large place (we fancy it has a population of 10,000 or so); and therefore, from the outset, the smaller the electricity scheme the better, for then the less would be the money likely to be lost over it in the burgh. Falkirk, with its far greater population, struggles to make the ends of its electricity finance correspond; and there are numerous towns in other parts of the country, with greater opportunities than Irvine, that fail to realize their laudable ambitions in regard to finance. Far the largest part of the initial expense of this Irvine scheme has, it is said, been wiped out by jumping from a steam-driven plant to a suction-gas plant; and the result is that the Committee are of opinion that they will be able now to sell electricity for private lighting at 4d. per unit, and for street lighting and motive power at 1½d. These prices are based on a hypothetical consumption of 72,000 units per annum. But certain of the good councillors of Irvine seem to have lost their heads having got to this stage, and to have forgotten that the putting down of an electricity works does not mean that the business is assured. Falkirk with three times the population, and supplying at ½d. per unit above those prices, after three or four years' running, according to the accounts to May, 1904, only disposed of 129,000 units; and this included about £670 worth of current for public lighting, at a cheap rate. However, it is little good pointing to Falkirk, when in the matter of costs, there are members of the Irvine Council who have got electrolytis so badly that they believe sincerely that they will, in the matter of costs, be able to put Glasgow in the shade. Of course, the £6646 15s. quoted to them is only the bare cost of installation, including the conversion of 100 street-lamps, but not anything for meters, or, it may be found, for several other necessary purposes. It is such councillors as those who have been worked up to the extraordinary pitch of belief existing at Irvine who require to be temporarily protected against themselves, until they have looked beyond their own pet scheme, and gained wisdom from the experience of others who are similarly circumstanced.

WAGES AND HOURS OF LABOUR IN 1904.

One of the annual reports of the Labour Department of the Board of Trade which form such useful indications of the state of trade throughout the country was issued last week. Mr. A. Wilson Fox is the compiler; and the subject dealt with is the changes in rates of wages and hours of labour which took place in 1904. The present is the twelfth issue of the report; and, like those for the preceding three years, it records a net reduction in wages—nearly all the principal groups of trades showing some decrease. The amount of the fall, however, measured in weekly loss of wages, though slightly more than in 1903, was only about one-half that of each of the two years before. The exact figures are a decrease of £39,200 in weekly wages last year, as against £38,300 in 1903, £72,600 in 1902, and £76,600 in 1901. Not quite all the workpeople were adversely affected last year; for out of the 801,000 or so who had their wages changed, some 16,000 were fortunate enough to obtain increases amounting to rather more than £1200 a week.

It is obvious that the time of the year at which the changes take place must govern the total increase or decrease in the wages bill; and thus we see that the falling off last year reached £938,000, as compared with £500,000 in the previous year, though the decreases measured in weekly loss of wages were very nearly the same in each separate case. These figures, it should be pointed out, relate only to alterations in the rates of wages; mere changes in earnings caused by fluctuations in the amount of available employment not being included. Some further testimony is furnished by the report as to the growing prevalence of "sweet reasonableness" in the settlement of disputes; for Mr. Fox remarks that it is again satisfactory to note that, though questions of wages are a frequent cause of labour troubles, the great bulk of the changes that actually occurred last year were arranged by conciliation, arbitration, wages boards, sliding-scales, and other conciliatory agencies, without any interruption of work. Of course, however, the miners, with their joint boards of employers and men, were largely responsible for this state of affairs. It is to be noted that during the first six months of this year the changes of wages reported resulted in a net reduction of £9800 in the weekly wages of 305,300 workpeople; the decreases being mainly in the coal mining, engineering, and shipbuilding trades. In the corresponding six months of 1904, there was a net decrease of £13,000 weekly; some 275,200 workpeople being affected. There was nothing very striking in the changes in hours of labour recorded during 1904; the net effect of all the changes being a reduction of 24,599 hours per week in the working time of 16,792 workpeople.

Naturally, the fluctuations in wages are felt more severely among coal miners than in other branches of industry. Of the total number of workpeople affected in 1904, no less than 82 per cent. were coal-miners; while for the preceding two years the figure was even higher. The decrease in the weekly wages last year was about the same as in 1903, but only about half that in 1902 or 1901. The gas industry does not figure largely in the report, as we are only able to trace one case referring to a Company. This was at Great Grimsby; and the change in that instance was, as is generally the way with gas workers' wages, in an upward, and not in a downward, direction. Satisfactory, however, as the alteration doubtless was from the point of view of the men concerned, it was not sufficiently great to affect the statistics to any appreciable extent; the entry being forty gas stokers, an increase of 2s. 5d. a week each, making a total rise of wages of £4 17s. Coming to employees of local authorities, we notice that at Ossett the lamplighters had a rise of 1s. a week, to 19s.; while at Manchester the gas-works labourers' were given 2s. a week more, making the wages 25s.

AN INTERESTING SCHEME OF WORKS RECONSTRUCTION AT NORWICH.

Norwich, as the home gas industry knows, is one of the important stations of the British Gaslight Company. To-day, it is in its degree one of the most flourishing and promising; and through energy, enterprise, reorganization, and a large but necessary expenditure of capital, the works and business have been placed on such a solid foundation that now it may be regarded as a veritable stronghold in the Company's diversified fields of operation. It was not always that the station could be looked upon in such a favourable light. Strenuous effort and much heavy reconstructional work have had—through retarding influences, and what appeared to be almost insurmountable obstacles—to cover a considerable period of time, to bring about a condition of things which finds the Company in possession of works in the ancient city comprehending the states of newness, solidity, economy in operation, capacity for meeting prospective increase in business (for, it is anticipated, some years), and presenting to the engineer features unique, and marked with boldness alike in conception and execution. At the same time, the business of the undertaking in the district has not suffered inattention through the claims of the works; and coincidentally with the completion of what are to all intents and purposes complete new works, the Company have on their registers consumers in number and in their books the records of business in quantity unequalled in the history of the station. The position is a happy one, and fully justifies the bright outlook which the Chairman of the Company (Mr. J. Horsley Palmer), speaking on behalf of his colleagues, takes of their affairs in Norwich.

Development.

The condition of things which we have been portraying in general terms is, as is said, the fruit of the work of some years. The relief from further anxiety in regard to the works is the honour of the Engineer, Mr. Thomas Glover; and we venture to say that—notwithstanding the laborious character of the work which devolved upon him, the scheming required to build the new works on the site of those by which the gas supplied to the city was being simultaneously made, and to obtain for his Company the maximum productiveness from the areas at his disposal—Mr. Glover deemed himself fortunate as an Engineer in having such an opportunity, and in receiving the endorsement of his Board to the plans he submitted for the complete transformation of the works. It was not only the aged and worn-out, uneconomical working condition of the plant that rendered the scheme now consummated necessary, but united with it was the great development of the business. Here it must be said that in this development, Mr. Glover's predecessor, Mr. John Young—whose elevation to Hull in 1901 was, it will be remembered, the opening for Mr. Glover's appointment to Norwich—did a large amount of the "spade-work" which produced much of the present result and expectation for the future; and it so happens that through certain incorrigible circumstances of the kind which defy the best of intentions, Mr. Young had to labour under all the disadvantages in connection with the works which Mr. Glover found on his arrival, but which by that time it had become absolutely essential to deal with in one manner or another. The continuous character of the development of business both during Mr. Young's management and that of Mr. Glover can be best shown by statistics taken from the books. In the first place, the half-yearly consumptions are a good index to the progress achieved; and here are the figures, showing an unbroken chain of increments from June 30, 1897:—

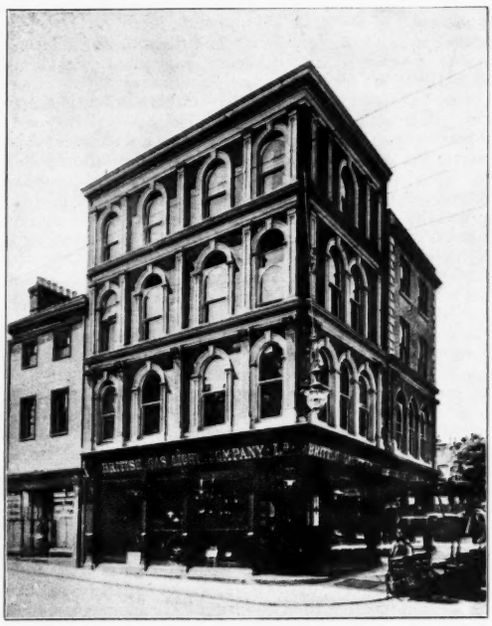
Half Year ended	Cubic Feet.	Half Year ended	Cubic Feet.
June, 1897 ..	137,484,300	June, 1901 ..	179,376,900
Dec., 1897 ..	138,491,200	Dec., 1901 ..	183,267,100
June, 1898 ..	138,059,900	June, 1902 ..	184,524,800
Dec., 1898 ..	144,633,400	Dec., 1902 ..	196,690,800
June, 1899 ..	146,011,500	June, 1903 ..	200,656,200
Dec., 1899 ..	161,747,400	Dec., 1903 ..	207,979,200
June, 1900 ..	172,620,700	June, 1904 ..	219,195,105
Dec., 1900 ..	174,373,400	Dec., 1904 ..	214,609,000
	June, 1905 ..	213,393,080 cubic feet.	

A comparative statement of stoves, ordinary meters, and prepayment meters fixed in the district also exhibits the rapidity with which the business has been advancing:—

Half Year ended	Stoves.	Fittings.	Prepayment Meters.	Ordinary Meters.
June, 1897	2,652	*Nil*	2,554	5,733
,, 1901	7,707	3,911	7,044	6,335
,, 1905	15,513	12,314	15,045	6,748

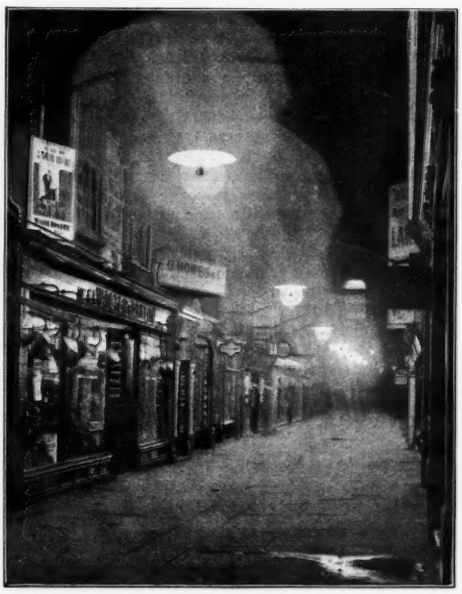
The Company, too, have been developing a good trade in all kinds of consumers' fittings, and self-intensifying gas-lamps for shop lighting; and they undertake the maintenance of lamps and incandescent burners. One of the interesting installations of high-power lighting to be found in the city is at Davey Place, which is seen to be lustrously illuminated by six 1000-candle power Lucas gas-lamps. This is not a roofed-in court, but is quite open to the sky; and it is well lighted to compete with a neighbouring arcade. This example of the Company's outdoor work is mentioned, because an opportunity presented itself for illustrating it.

The rate of business advance which is here illustrated from the past will not decline in the future for the want of perseverance. The Company have a competitor in the municipal electric lighting undertaking which is conducted with equal business acumen; but the most friendly spirit pervades the relations



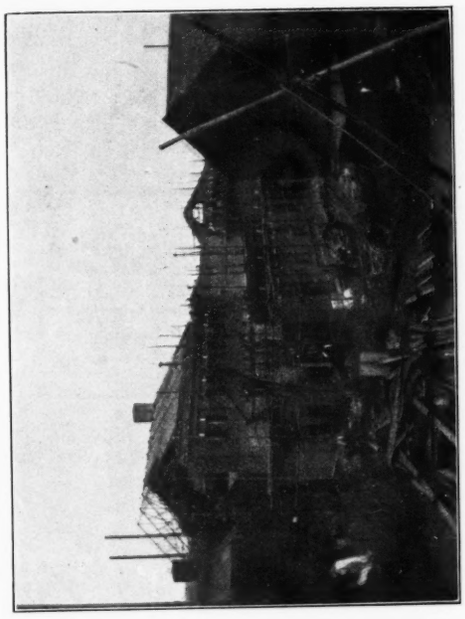
British Gaslight Company's Show-Room at Norwich.

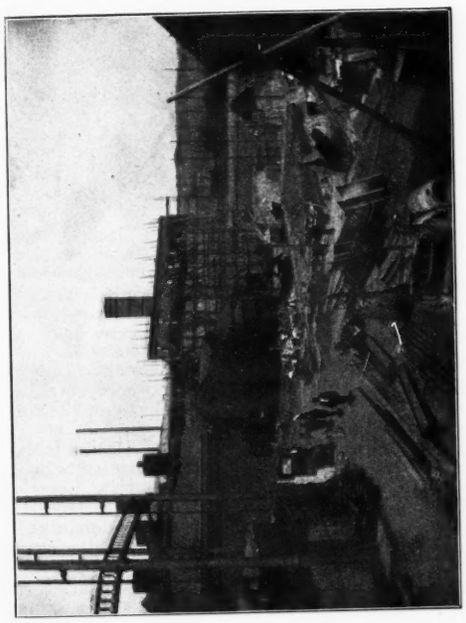
of the Company and the municipal undertaking. In fact, the Corporation and the Company are on the most pleasant terms; the former not entertaining, as in some cases, the unreasonable

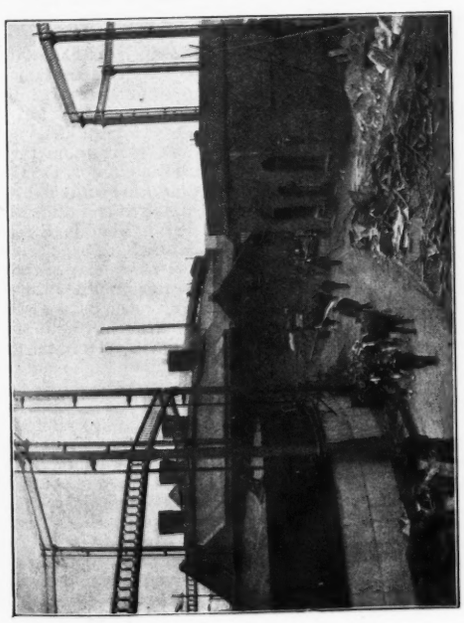


The Lighting of Davey Place by Lucas Lamps.
(Photograph taken at night.)

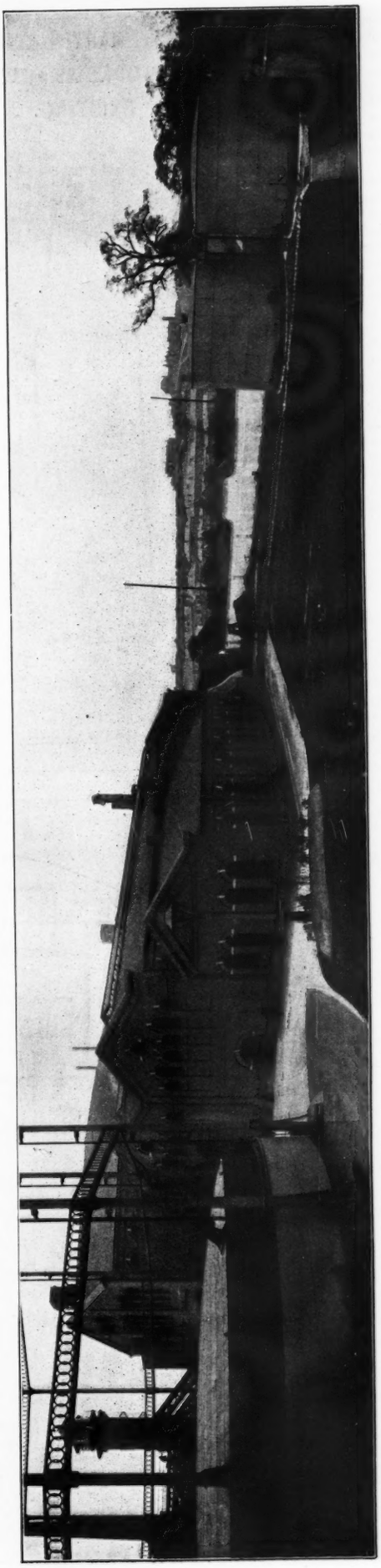
and mistaken notion that an influential Company and large ratepayer in their midst, serving well the public interests, should be the object of inimical feeling or petty hostility. There is, of course, no quarter in the matter of securing lighting business. The Gas Company have extended their show-room, which is located in one of the finest positions in Norwich, and worthily represents the considerable and varied classes of business the





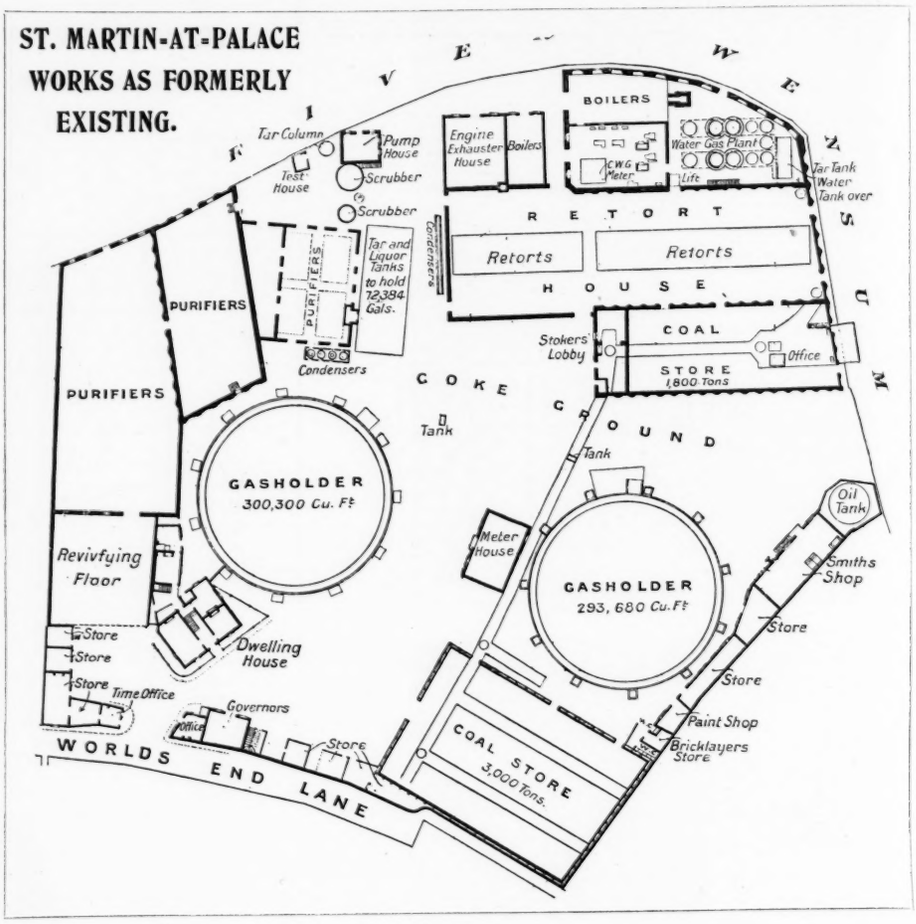


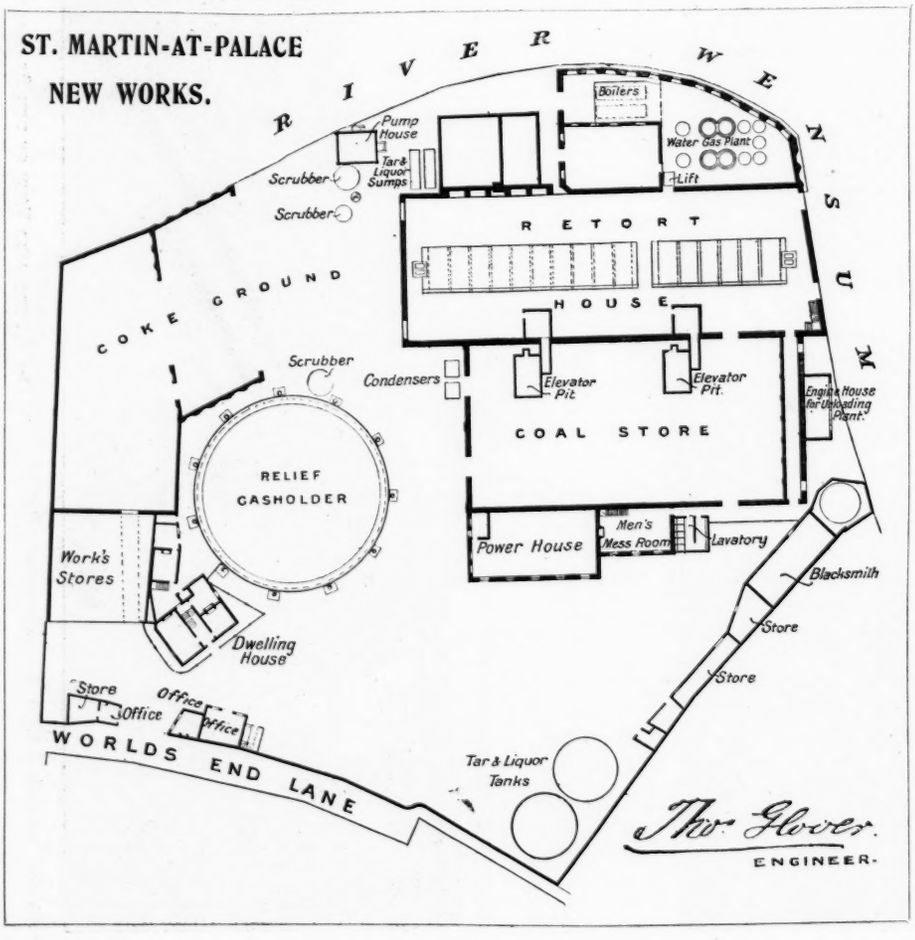
St. Martin-at-Palace Works During the Period of Reconstruction.



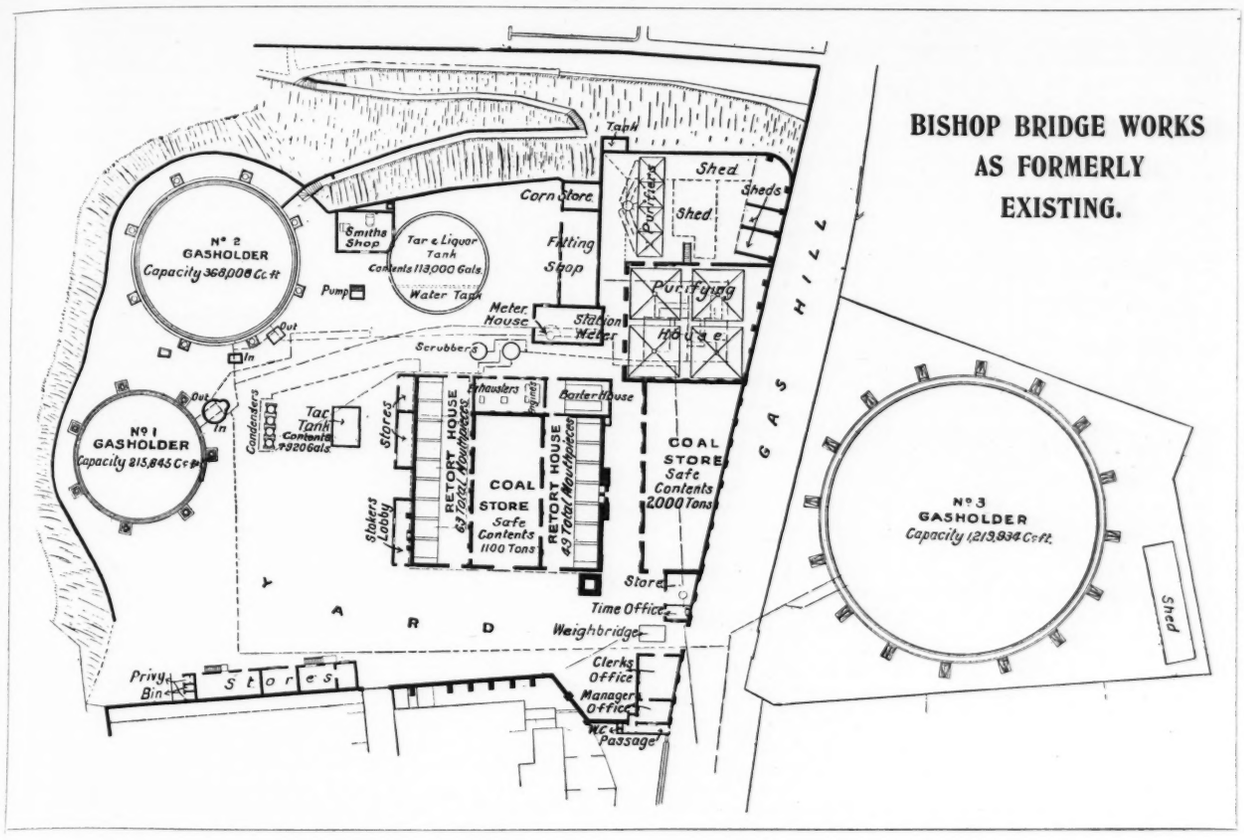
Panoramic View of the St. Martin-at-Palace Works as Completed.

Company undertake. The premises are situated at one of the corners of the Market Place and The Walk. There is an extensive window frontage on the Market Place, and a large but smaller one claiming attention in The Walk. In passing, it may be said there are to be seen samples of the cooking-stoves and the fires of most of the makers of such appliances, and the proper method of fitting houses with water-heaters is also demonstrated. In water heating, Mr. Glover believes that there is before gas undertakings a good field for cultivation, providing they insist on the work being carried out on rational lines. In the show-room there is, for instance, a large geyser with ventilating-pipes and everything properly fitted, demonstrating that hot water can be obtained in the bath-room or other part of the house by the mere turning of the water-tap. The turning of the tap —no matter the distance from the geyser—and the flow of water automatically open the gas-way to the luminous burners below the geyser, and cause the gas to be ignited by the pilot jet, while the closing of the water-tap extinguishes the gas, without any trouble on the part of the person requiring the hot water. This is not a new arrangement, but we mention it for the purpose of again drawing attention to it.





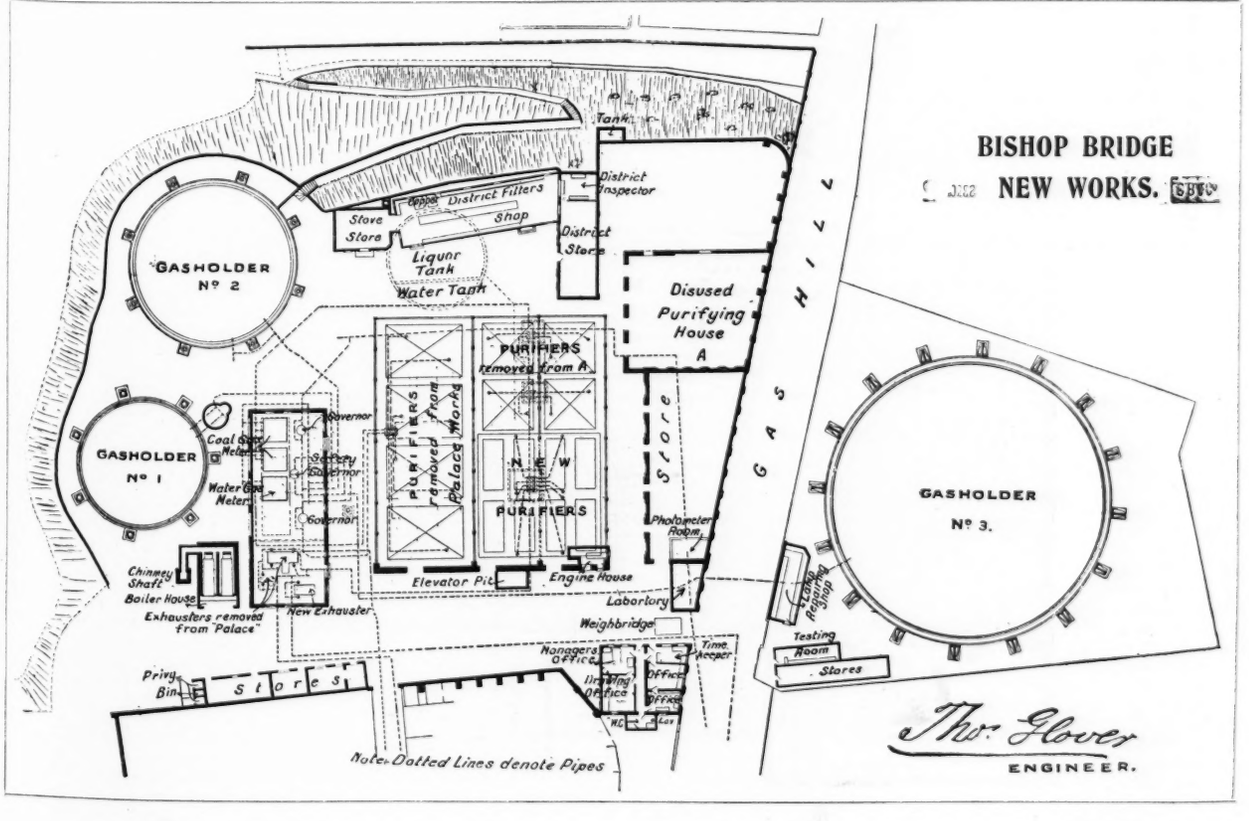
Before this little digression, we were writing about electricity and lighting. The show-room is effulgent at nightfall with indisputable testimony of what can be done by gas in conjunction with the incandescent gas-burner and mantle. In one window of the show-room, too, are seen a gas-engine and a dynamo; and the curious are informed by a printed card that, by the use of engine and dynamo, electricity for those who require it can be obtained (without restriction to any one purpose) at 2d. a unit, and truthfully Mr. Glover might have added "or rather less." Again, in the public thoroughfares, the Corporation have only lighted electrically the Prince of Wales Road, London Street, and Market Place; the whole of the remainder of the streets being illuminated, at reasonable cost, by well-kept incandescent gas-burners, enclosed in lanterns that the Company take an especial pride in keeping clean. The public favour and compliment that the public lighting by gas has brought to the Company are at once a satisfaction and encouragement. Its success and comparative cheapness should be factors in any decision the Corporation may eventually come to in regard to lighting the public lamps. Judging by the

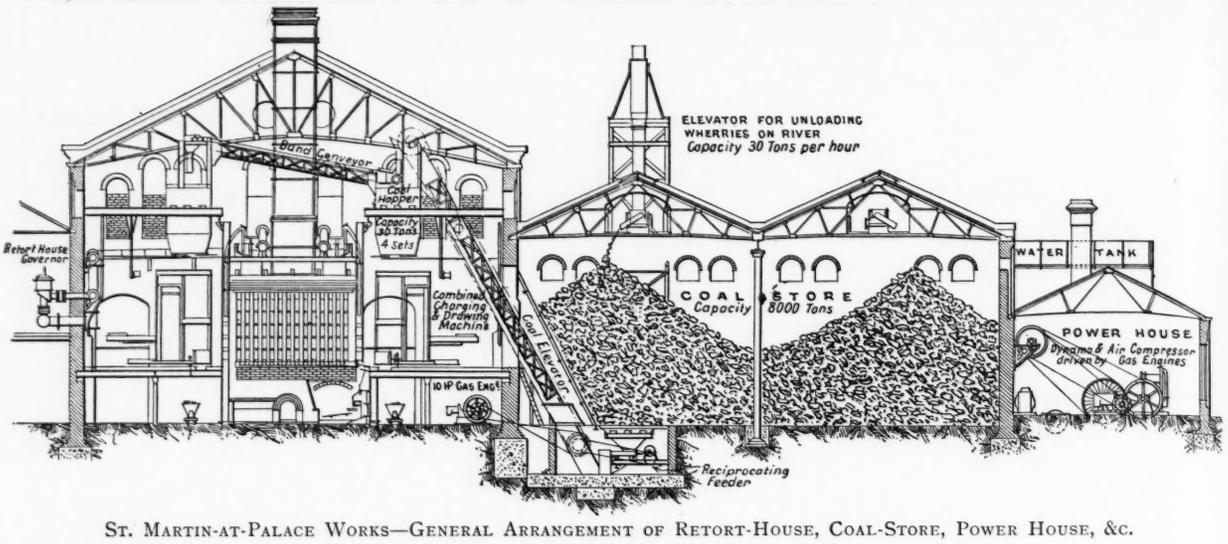


appearance of the streets, electricity cannot have fulfilled all expectations, especially in the streets illuminated by the Nernst lamps; for even anyone with a predilection for electricity could not pay a chance visit to the city and assert that the Nernst lamps were doing favourably.

The Works Problem, and its Solution.

Sufficient has been said to show that the question of new works had become an exigent one some two or three years ago; but to put the position clearly before readers, it is necessary to lightly touch upon the past of the Norwich works. There are, and have been for all time in the history of the gas supply of the city, two gas-works—known, in order to discriminate them, the one as the Bishop Bridge works, taking its name from a neighbouring bridge across the River Wensum, a tributary of the Yare; and the other, the St. Martin-at-Palace works. So far as inquiry enables us to state, the two works in the first quarter of the last century belonged to different Companies. The Palace works

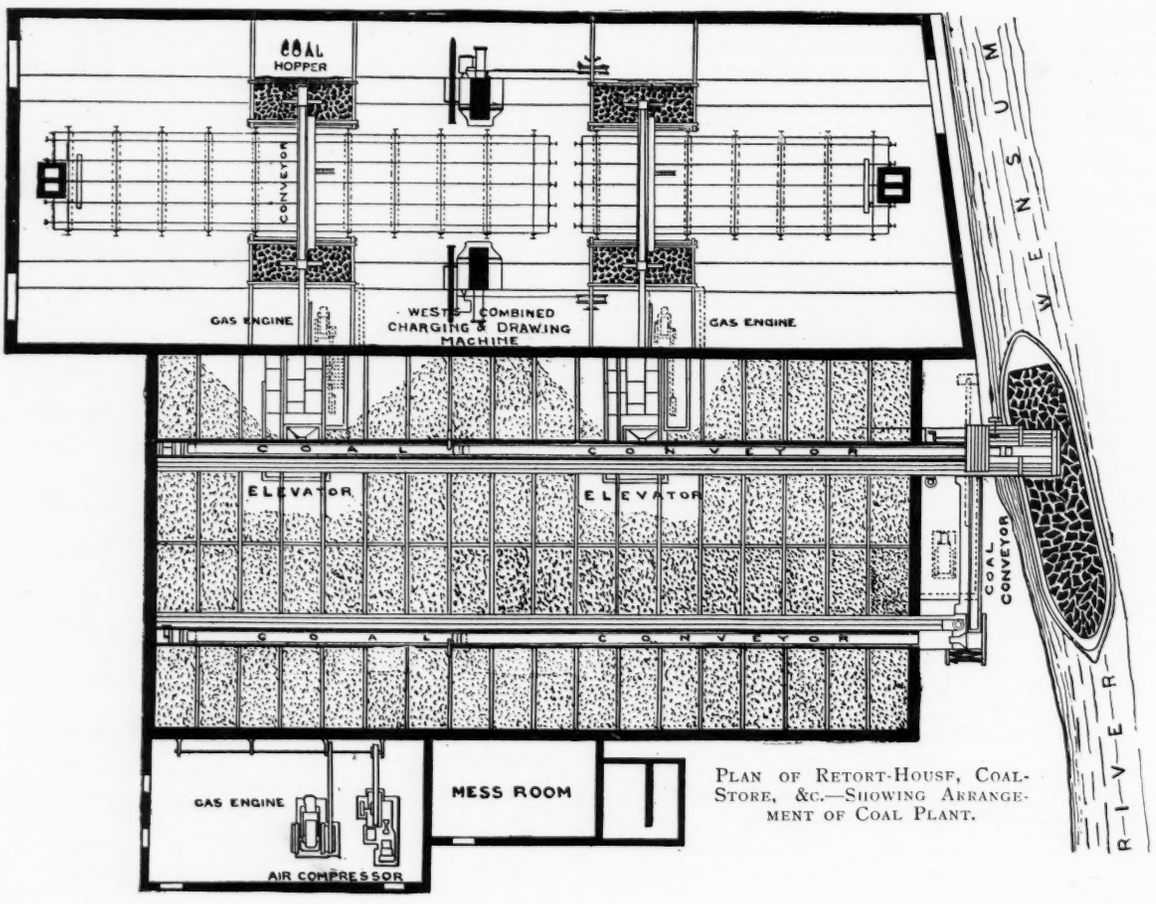




ST. MARTIN-AT-PALACE WORKS—GENERAL ARRANGEMENT OF RETORT-HOUSE, COAL-STORE, POWER HOUSE, &c.

were originally established for the production of oil gas for the supply of numerous factories then existing; the city being at that time quite an important weaving and spinning centre—silks, woollen goods, and yarns being the principal fabrics. The other works were devoted to the manufacture of coal gas.

It was in the year 1824 that the British Gaslight Company entered, by purchase, into the ownership of the works; and until just lately no additional land has been purchased—the addition being but a small extension of one of the existing sites. The two works are separated by a distance of rather more than ½ mile; and each, before the execution of the scheme under description commenced, was a self-contained works. But that in itself—the division of all the operations—apart from other considerations, was not an economical condition. There, of course, comes a time in all gas-works when there must be thorough reorganization. Additions and alterations may enable the engineer to tide over requirements for a time—perhaps for some years; but the growth in demand ultimately produces the pressure that compels the recognition that either new works on a fresh site must be erected, or that from beginning to end there must be reorganization and reconstruction on the old site. Half measures then will not avail. That was the position in which the Company found themselves twelve years ago. They entered into negotiations with Messrs. J. & J. Colman for a new site that was then chosen. But fear intervened. The land was low-lying, and by the river; and the possibility of the works being flooded if located there created doubt, and the negotiations fell through. It may be questioned whether that fear was justified. At all events, without knowledge of what had previously happened, Mr. Glover looked with favour upon the same site when he first arrived in Norwich; and three years or so ago negotiations were again seriously opened with Messrs. Colman for its acquisition. The well-known firm, however, desired to impose onerous stipulations as to nuisance and other things such as the Company could not possibly entertain; and there the question of a new site ended. These, however, are points that it is desirable to mention so as to establish the necessity from an engineering point of view for carrying out a scheme of reorganization and rebuilding on the present divided sites.

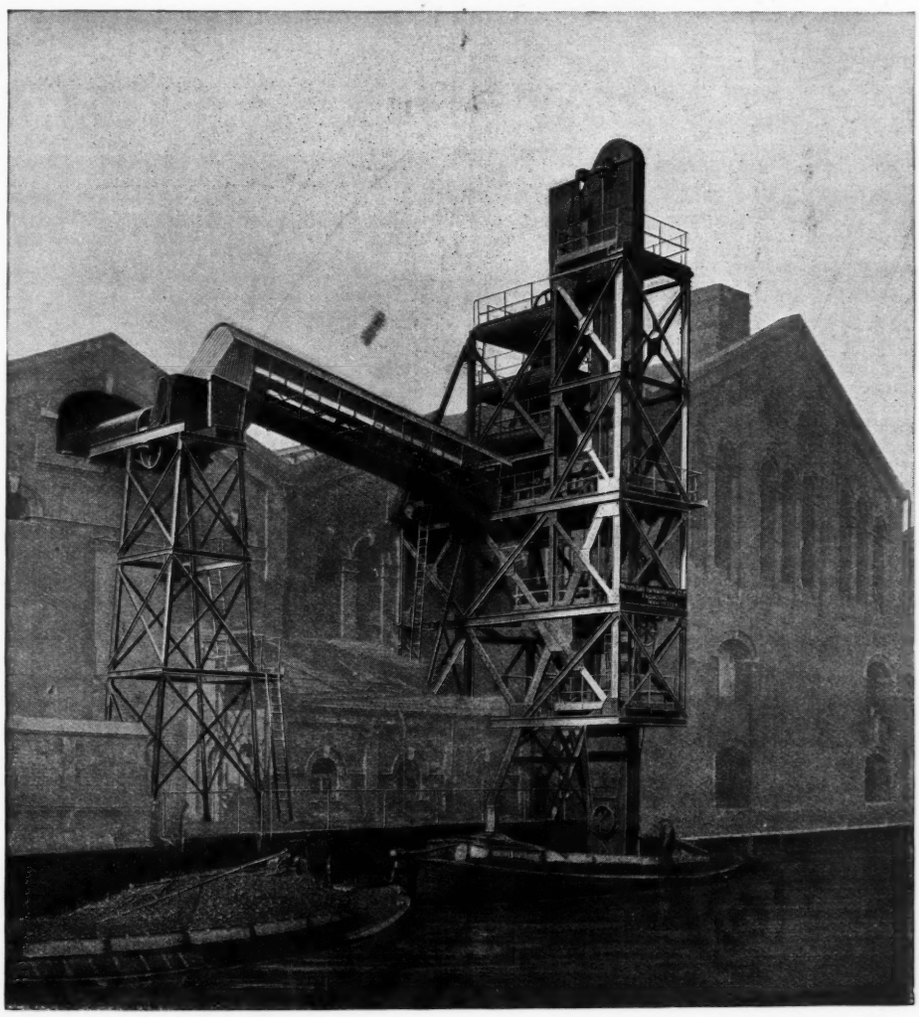


PLAN OF RETORT-HOUSE, COAL-STORE, &c.—SHOWING ARRANGEMENT OF COAL PLANT.

In the winter of 1902-3, matters became pressing. Every retort in the retort-houses was going, in addition to the carburetted water-gas plant; and Mr. Glover had then to report to the Board that if it was the intention to reorganize the plant on the existing sites, the matter could no longer be delayed, owing to the growing demand for gas. The Board did not delay; and in February, 1903, Mr. Glover was instructed to prepare plans and estimates for the rebuilding of the works. These were soon accepted at headquarters, contracts were prepared and entered into, and immediately afterwards an earnest start was made in pulling down sections of the old works and putting in the foundations for the new buildings. And owing to the nature of the subsoil and the proximity to the River Wensum, the foundations had to have a great amount of care expended on them. However, there was no time to be lost, as by the autumn the new plant to the extent of its completion would, of course, be required for the winter's work. The scheme has now been finished; and what it has comprised will be seen by comparing the ground plans of the works as previously arranged and as existing now. During the vast changes that have been made, the supply of gas to the city has never once suffered, though at times the position to one who was not living in it would have found a fitting simile in a tangled skein. The fact of the constant supply throughout, an investigation into the work done, the works that exist and the order that reigns to-day, permit us to pass the compliment that the hand that held the threads, though the tension at times must have been severe, did so firmly and with an ever-present knowledge of where each one led. In his chief assistant (Mr. Moon), Mr. Glover had in the work a helper whose assiduity deserves at this point due recognition.

The Division of the Manufacturing Operations.

We have suggested that what is now to be seen at Norwich in respect of the division of the manufacturing processes is unique in gas-works operation. The two works, it will be remembered, are situated rather more than ½ mile from each other. What has come to pass by the completion of Mr. Glover's scheme is the concentration of all the work of carbonization on the St. Martin-at-Palace site (where the incoming and outgoing materials can be most economically dealt with), together with the condensation and scrubbing; while the exhausting, purification, measurement, and storage is carried on at the Bishop Bridge works. Necessity is the mother of invention; and necessity, combined with economical working considerations, it will thus be seen has produced a separation of operation that, to the best of our knowledge, has never before been practised in gas manufacture, and it works well.



West's Coal Plant for Unloading the Barges, Elevating, Breaking, Weighing, and Placing in Store.

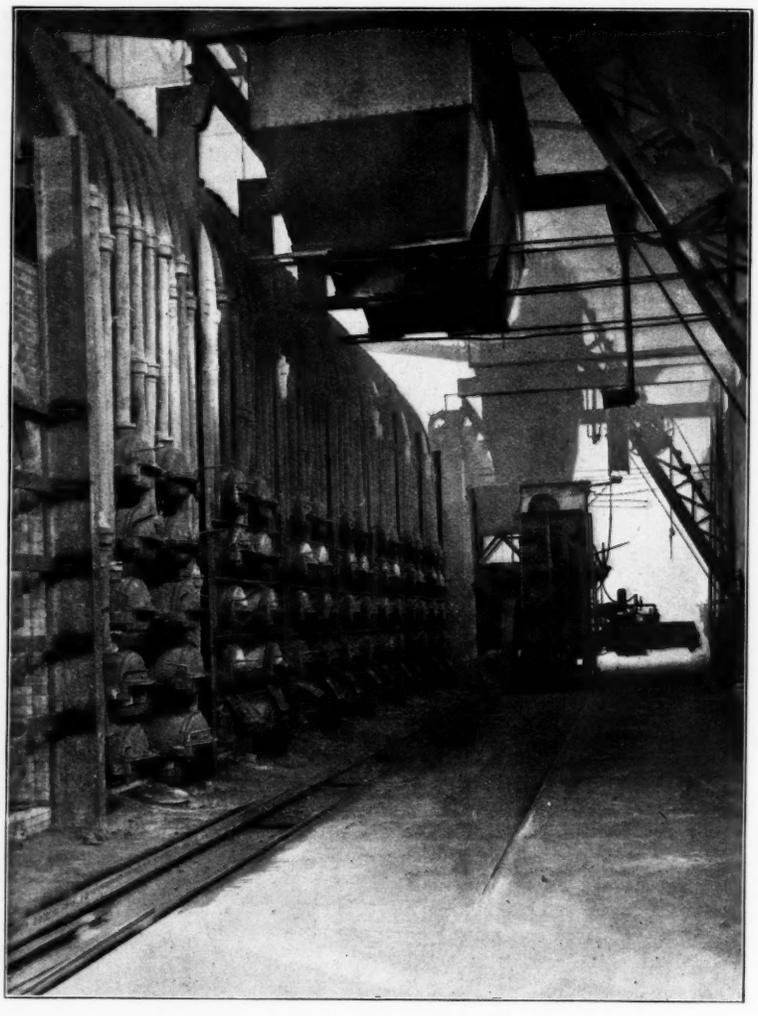
At the St. Martin-at-Palace Works.

The greatest problem for solution at these works was how to take down the old retort-house (the capacity being 1 million cubic feet), and to erect upon its site a house for 2½ million cubic feet, fully equipped with coal and coke handling plant. The drawings and the photographs will enable readers to partially realize the great difficulties which this presented from an engineering point of view. The new retort-house was built, as it were, over the old one; and the retort-bench had to be dealt with section by section.

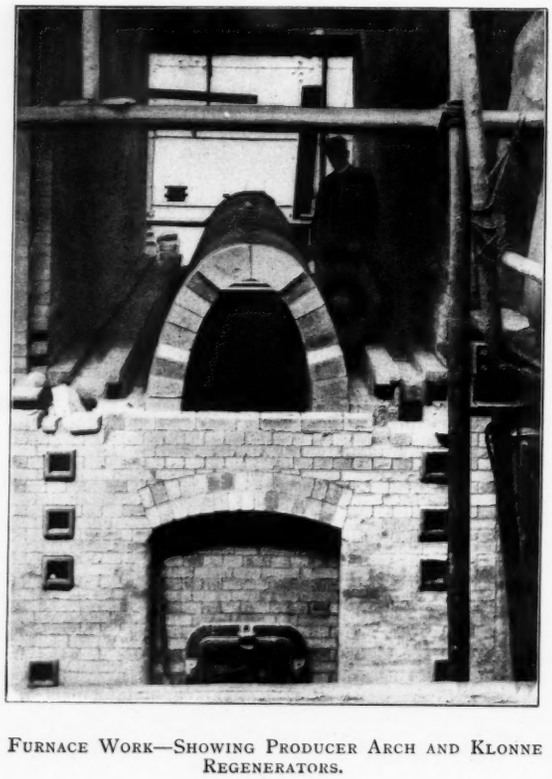
We have, however, to treat of what now exists, and to leave to Mr. Glover to explain, at the forthcoming meeting of the Midland Association of Gas Managers, the reasons for the plans he adopted, and the methods by which engineering difficulties were overcome. First of all, as to the buildings. As they now present themselves, we have facing us on entering the works a building comprising the power house and men's rooms, next to it are the coal-stores, followed by the retort-house, and finally the building containing the carburetted water-gas plant. This range of buildings at their rear ends almost border the River Wensum, by way of which the coal supply comes. All the buildings are uniform in architectural character. They are built of Fletton brick, faced with red brick, with, in the buildings requiring them, Gunton's arched windows, terra-cotta copings, and steel roofs, covered with Somerset tiles. The retort-house is 200 feet long, 70 feet wide, and 50 feet to the wall plates, with cambered principals in the roof. The coal-store measures 162 feet long, 80 feet wide, and 32 feet to the wall plates, and the storage capacity is about 8000 tons. The roof of the coal-stores is a double-span one,

and has two rows of patent glazing over the ventilators running the full length of the two bays of the store. The principals of the coal-stores are designed with double-channel ties, thus stiffening them considerably, to take the coal-conveyors. Next to this is the power-house, 60 feet long and 32 feet wide. The men's mess room is 34 feet by 20 feet; and the bath room, lavatories, &c., are built in conjunction. The buildings have all been constructed in a style that gives one a feeling of airiness and spaciousness. Mr. Glover is a great believer in limewash in all the buildings in which work is carried on—even to the retort-house; and truly it has a marked effect in the matter of both light and cleanliness. The power-house and the men's mess-room, the bath-room, lavatories, and so on have cement plastered and painted walls, with glazed brick dados; and the combination is very effective. The carburetted water-gas plant house is not a new building. In the work of reconstruction, a gasholder of about 95 feet diameter, and of a capacity of 300,000 cubic feet, has been removed to make room for the buildings; an old wooden coal-store, which was so far removed from the retort-house as to make its utilization expensive in working, and which only held about 3000 tons, has now disappeared; while the purifying plant which formerly occupied space at these works, has been entirely cleared away, and this has opened up a good coke ground.

From what has been said, will have been seen the first result of the reorganization. It is that on this site the carbonizing capacity has been increased from 1 to 2½ millions; the coal storage accommodation from 3000 to (say) 8000 tons; while the coal has been brought into the closest possible proximity to the point of its use. Besides this, a good coke ground has been secured, as well as other conveniences which will be unfolded as the description proceeds. Messrs. Thomas Vale and Sons were the contractors for the buildings at both works, as well as for the retort-house, stage-floors, and the bench work. The roofs for the retort-house and the coal-stores were supplied by Messrs. C. & W. Walker.



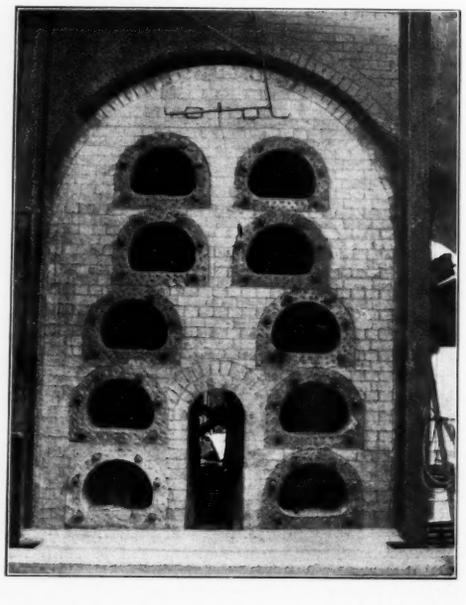
General View of Retort-House at the St. Martin-at-Palace Works.



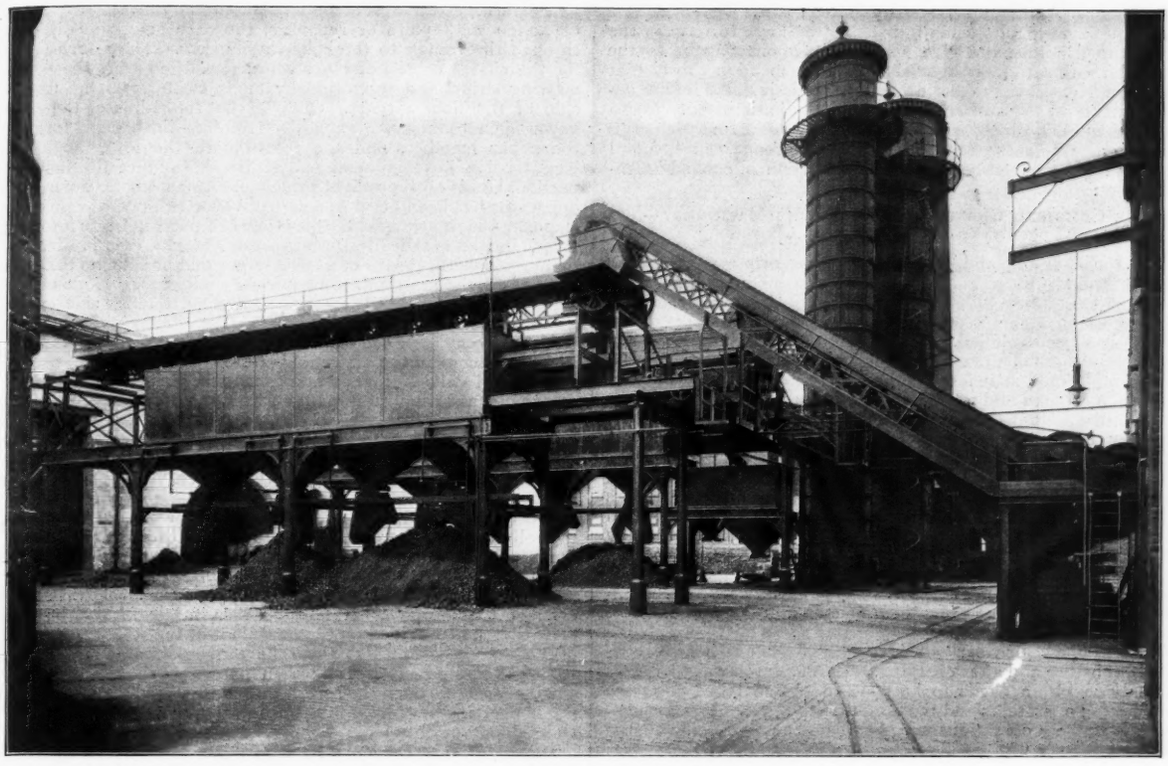
Furnace Work—Showing Producer Arch and Klonne Regenerators.

The Coal Plant.

The scheme embraces mechanical working from the reception of the coal to the discharge of the coke into the waggons from overhead coke-hoppers; and therefore it will conduce to simplicity of description if we now turn to the River Wensum, by way of which lighters convey the coal to the works. The whole



Retort Setting—10 Feet Centre to Centre of Piers.



The Jenkins Coke Plant, Showing One of the Inclined De Brouwer Conveyors and the Storage Hoppers.

of the work of coal handling from barge to retort is done mechanically. The contractors for the coal plant were the West Gas Improvement Company, Limited; and their name is the guarantee that strength is a feature of the work. The plant indeed constitutes one of the most complete we have seen. On a recent visit to the works, a barge was being emptied; and the ease with which the plant was dealing with it was very pleasing. The portion which does the work of picking the coal from the barges and transferring it to the stores is shown in one of the photographs; and it forms a notable and interesting engineering feature of the works. The coal is lifted from the boats by an elevator 70 feet high, suspended in a tower-like frame; and simple means of adjustment are provided, which allows the elevator to be lifted and lowered a height of 10 feet, to accommodate the rise and fall of the tide, and the depth of coal in the boat. The controlling gearing of the apparatus is so arranged that the attendant, when standing on the wharf, is able to operate the mechanical arrangements for the lowering and raising of the elevator in and out the boat. The elevator is fitted with West's stamped steel elevator chain of strong pattern, to which are attached buckets of large capacity (2 feet wide); the mouths of the buckets being serrated so as to facilitate the entering of the coal. After the coal is elevated, it is delivered into a coal-breaker which reduces the large pieces of coal to a size suitable for the retort-charging machine. The reason why the coal is broken right away at this point is because below the breaker is an Avery automatic weighing-machine, which weighs the coal and registers the weight on a recording dial. This machine can weigh 5 cwt. at a time, but will not work with unbroken coal. From the time it was brought into use, it has weighed 40,000 tons with very little trouble. From the weighing-machine, the coal passes into a reciprocating feeder, which delivers the coal in regular quantities on to one of a system of three conveyors—two, running through the coal-stores, 180 feet long and the other 33 feet long; this being the outside cross conveyor delivering the coal to the coal-store conveyor farthest from the elevator. The whole of the apparatus so far described is supported by a very strong braced structure, which is well anchored to the wharf. The longitudinal Scandinavian belt conveyors (2 feet wide) which store the coal are situated one in each bay of the stores; and, being carried on the roof principals, are some 31 feet above the store-floor. Each belt is provided with a travelling throw-off apparatus for the purpose of depositing coal at any point in the length of the store. The plant so far described is driven by a 35-horse power "National" gas-engine, and has a capacity of 30 tons, though, if necessary, this can be exceeded. It is calculated that by the plant, the coal can be put into store, including labour and gas, at 1d. per ton; whereas it used to cost 3d. under the former method, which comprised an elevator for lifting from the barges, but with only a capacity of 9 tons.

The coal which is being used is dropped in the coal-store in such a position that it can be put into the retort-house without any wheeling or shovelling. It is dumped down over two hoppers, 8 feet square, below each of which is a reciprocating feeding arrangement, which prevents the overloading of the elevator buckets, no matter the weight of coal above the hoppers. It is interesting to see the huge heaps of coal in the coal-stores at the place where this mechanical feeding of one of the two retort-house elevators is going on. Quite a crater is formed in the top of the heap. It is equally interesting to watch the regularity with which the automatic feed arrangement performs its function. The two elevators leading from below the coal-store floor to the hoppers and conveyors in the retort-house are centre to centre 44 feet long, and are each provided with a steel shield. There are four sets of overhead hoppers (two on each side of the house), each set having a capacity of 30 tons; so that the total storage is 120 tons. Cross conveyors, 2 feet wide, transmit the coal to the hoppers on the side of the house away from the coal-store. One elevator and conveyor set is driven by a 10-horse power Crossley gas-engine, and the other by an old steam-engine.

The Retort-Settings.

The house, of course, is a stage-floor one; the floor being spacious and strongly constructed for machine work. The benches consist in all of sixteen settings of ten retorts in two vertical tiers. For convenience, one bench contains ten settings and the other six. Messrs. Thomas Vale and Sons were responsible for the construction of thirteen of them and the West Gas Improvement Company for three. The furnace it is noticed is of the type that Mr. Glover took great pride in developing at West Bromwich. The regenerative part is of the Klönne pattern, with improvements, and needless to say, as we see these furnaces at Norwich, Mr. Glover considers the Klönne regenerator is of the best type. Both Messrs. Vale and Sons and the West Gas Improvement Company, time has shown, put excellent work into the settings. The settings are fitted with ten retorts in each, 22 in. by 16 in. by 21 feet long, of ⏢ section. It is evident that Mr. Glover believes in getting the maximum productive capacity out of his retort-houses. The retorts, as just said, are arranged in two vertical tiers, but in their arrangement forming as it were an arch towards the top. Set in this way, 10 feet centres between the piers suffice, while, if settings of eights had been adopted, set in the ordinary way, 11 ft. 6 in. centres would have been required, which would have meant fewer retorts per setting, and fewer settings in the house. Only one other point about them. It is interesting to learn that part of the settings were commenced in the February of the year the scheme was taken in hand, and by September they were in operation. This was done before the roof of the new house was on, and while the other part of the old house was working.

There is nothing worth special mention about the retort-bench ironwork, which, for No. 1 bench, was supplied by Messrs. Newton, Chambers, and Co., Limited, and for the No. 2 house by Messrs. R. & J. Dempster, Limited. It is remarked that the

Bournemouth" arch-pipes were adopted; and we also learn that trouble from pitch has induced Mr. Glover to forsake the dry main principle, and give his preference once again to the hydraulic with extremely light seals. An inspection shows that the pride Mr. Glover takes in his settings is justified by his unimpeachable heats, and charges excellently carbonized. Just a little flame was noticeable coming from a few inches of the charges near the mouthpieces; and this is also a preference, as it is found that it has a beneficial bearing on the question of choked ascension-pipes.

The Combined Charging and Drawing Machinery—Weighing the Charges.

For the charging and drawing of the retorts two of West's compressed air-driven combined machines are in use, specially arranged for dealing with retorts set five tiers high. Mr. Glover assures us that the West Company's guarantee in regard to labour has been fulfilled. For six settings, working with the combined machine, a machine man and a lid man on each side, and an additional man for the furnaces, are required. For ten settings, a lid man and machine man on each side, and a furnace man and assistant, are only needed. If anything out of the ordinary happens, an extra man may be put on. Talking of labour, it may be stated here that one coke man per shift suffices with the coke plant to be described presently; and only one man is needed to attend to the coal conveyors, elevators, and hoppers in the retort-house. The Engineer believes in keeping a rigid check over his coal, about 30,000 tons of which are used annually here. We saw that it was weighed directly on its receipt from the barges; and it was also noticed that, before and after the charging, the stoking machine is weighed to ascertain the quantity of coal in the hopper and the amount used. On each side of the retort-house is an Avery weighing-machine on to which the West machine is driven; and the machine man is held responsible for, before and after charging, entering up the weight. This not only enables a check to be kept on the coal, but upon the carbonizing operations and the production of gas. It was ascertained—as these operations were being watched—that the charge per mouthpiece was 3·8 cwt.; and the uniformity of the charge in the retort was very striking.

The Coke Plant.

In the smooth working of the retort-house, Mr. Glover regards the De Brouwer coke-conveyors that he has at work (with outside storing plant) as most important factors. These conveyors are wide—some 2 feet—because the drawing here is done so rapidly; and this saves the piling up of the coke. They are also situated 5 feet from the face of the bench; the greater distance being necessary on account of the height of the top retorts. The two lines of conveyors, including the exterior inclined part to the storage hoppers, are each 247 feet long; and they are driven electrically by two 13 kilowatt motors. The coke-storage hoppers in the yard are equal to 75 tons, and are fitted with breaking and screening plant. We will go into the structural details of the plant (which was supplied by Messrs. W. J. Jenkins and Co., Limited) with a little more fulness directly, as it may be noted here that, chatting over the subject of coke-conveyors with Mr. Glover, it is found that his experience coincides with that of M. de Brouwer, that many of the failures of coke-conveyors in England have been due to the fact that they have been allowed to run almost constantly—cases of 20 hours out of the 24 hours have been known; and, under such circumstances, the wear and tear must be very considerable. M. de Brouwer's practice is to get his coke away as quickly as possible; and so have the conveyors at work for the minimum space of time. Profiting by other people's experience, we find at Norwich Mr. Glover has planned his coke plant so that it shall run for the minimum time for the work to be performed. It has already been stated that it is driven electrically; and presently we shall refer to the electricity generating plant in dealing with the power-house. Starting-switches for the motors are situated within reach of the attendant at one end of the retort-house. It has also been arranged to apply a throw-off gear (to be worked from just immediately below the switches) for throwing the motor belt on to a fast-and-loose pulley. This will enable the coke plant attendant immediately a draw is finished to stop the conveyors, or to start them again at a minute's notice. In this way, it is expected that the wear and tear on the coke-conveyors will be materially reduced.

Now to deal with this interesting coke plant in a little more detail. The principal conveyors, it has been mentioned, are each about 247 feet long. After running the full length of the house, they pass through the gable wall, and slope up, at an angle of 35°, to a height suitable for delivering the coke into the troughs of the conveyors over the storage hoppers. The conveyors in the house consist of a trough 2 ft. 3 in. wide, formed of two steel bulb angle sides 7 in. by 3 in., riveted to a steel bottom plate forming a water-tight pan, in which are placed Jenkins's patent renewable bottom plates. These plates have raised paths on the sides for the chains to slide upon; and the chains, which are of the De Brouwer patent, are protected by means of steel angles bolted to the sides of the trough. The chains are held apart by steel bars, which are pitched at 2 ft. 1½ in. distance, and fixed to the block links, for the transmission of the coke along the trough. The troughs are carried on the floor girders, as previously stated, at a distance of 5 feet from the bench; and opposite each bed of retorts a water-tight door is fitted in the bottom, and so arranged that should the plant by any means be put out of action for repairs or renewals, the coke could be directed through the trough to the coke vault below. The return paths for the chains consist of two steel angles, fitted with renewable wearing strips, and supported by angle cleats from the underside of the floor girders. Outside the retort-house, the conveyor is in the form of a latticed girder—the trough forming the upper member, and the return path the lower member. The tension gear is arranged at the bottom of the inclined portion, and is on the weight principle. An automatic quenching apparatus has been fitted to each conveyor at the bottom of the slope, and is so arranged that, as the coke passes, it lifts a forked lever, and automatically turns on the water. This is directed on to the coke by means of a spray-pipe; and as soon as the coke has passed, the lever falls to its normal position, and shuts off the supply of water. Overflow grids are fixed on the side of the trough to carry off the surplus water. The sloping portion of the trough is completely cased-in, so as to carry the steam to the top, and thus complete the quenching of the coke.

The yard coke storage hoppers in each plant consist of four compartments, each 10 ft. 9 in. by 10 ft. inside, built up of steel plates, angle and tees, and carried on steel girders and cast-iron columns. Each compartment is fitted with a slide door and operating levers. The conveyor over each set of hoppers is about 70 feet long, and is built in the form of a latticed girder; the trough forming the top member and the return path the lower member. Suitable openings, fitted with slide-doors on the roller principle, are arranged together with double shoots for directing the coke into the various compartments of the hoppers. Each of the conveyors is driven by means of an electric motor with the necessary driving gear arranged on the structure at the ends of the hoppers. A coke-breaker, fitted with adjustable claw-shafts, is provided on the one plant at the retort-house end of the hoppers, into which the coke can be directed and broken to any required size. It is then passed over a screen; the small passing through the screen into a separate compartment of the hoppers arranged for the purpose. Underneath each of the slide doors of the large hopper, a movable screen shoot is arranged, so that the coke as it is being loaded into the carts will be screened—the breeze being directed to the back by a shoot underneath the screen. Each of these screen shoots is so arranged that a bagging shoot may be attached for filling bags; this shoot being fitted with clips for holding the bag in position while filling. Platforms are provided along both the inclined conveyors, along the side of the hopper conveyors, and around the driving gear on each plant; there is also a platform connecting both plants on the top of the hopper, together with the necessary ladders for connecting the various platforms.

In addition to the storing of the coke in the hoppers, a long shoot has been fixed at the delivery end of each hopper conveyor for directing the coke into the yard below. This shoot is of such an angle that the coke will glide gently down, and thus avoid excessive breakage. Arrangements have also been made in the hopper conveyor and structure for adding at some future date a gantry (to be built at right angles to the conveyors) for side-tipping wagons, which would receive the coke from openings provided in suitable positions, for the purpose of stacking in the yard. The whole of the work here described has an excellent appearance; and the plant was working admirably on the occasion of the visit. All the coke conveying and storage plant, together with the retort-house coal elevators for supplying the overhead hoppers, is attended to by one man per shift.

In the concluding article (which will be published next week), we shall deal with the remaining sections of plant at the St. Martin-at-Palace works (including the power house), certain problems and how they were solved in connection with the division of the processes between the two sites, and then with the important work that has been carried out at the Bishop Bridge works. There is too much of interest in this Norwich scheme to permit of its being pressed into one issue of the "Journal."

"Gas Manufacture" Classes in the Liverpool District.

The prospectus has just been issued of the classes to be held during the coming winter season at the Central Municipal Technical School, Byrom Street, Liverpool. There are nine groups of subjects dealt with; and each group is subdivided into a considerable number of specialized subjects. "Gas Manufacture" finds a place in Group H—"Miscellaneous Trade Subjects." The classes—under the direction of Mr. R. E. Gibson, Assoc.M.Inst.C.E.—are held on Wednesday evenings from 7.15 to 8.20. The following is the syllabus for the current session, which begins to-morrow: "Construction of retort-settings. Retorts and their connections. Conditions affecting quantity and quality of gas made. Methods employed and best conditions for cooling and purifying crude gas. Use and construction of an exhauster. How pressure is maintained, controlled, and recorded. Laying of mains and service pipes. Construction and fixing of gas meters, fittings, and burners. Simpler chemical and physical principles involved in processes of gas manufacture. Methods of testing gas for illuminating power and purity." The Secretary of the School (of whom further particulars may be obtained) is Mr. Walter T. Emery.

THE STUDENT'S LOT. *

THE student in any branch of learning has many difficulties to contend with, especially when he is entering upon his course of study. First and foremost is the difficulty of finding a text-book which shall display the rudiments of the art or science in question in a simple and progressive manner, so that the reader who approaches it through this medium for the first time is never left at a loss as to the author's meaning, and never finds the main issues confused by any immaterial or irrelevant detail. It goes without saying that the information afforded should be accurate. Such an ideal text-book for the elementary student is, however, but rarely found. Clear exposition is frequently lacking—almost solely because the author, either through carelessness or inability, has not written in plain and direct language. How many sentences in many well-known text-books fulfil their mission unmistakably and without any trace of verbiage? The answer in many cases would be disappointing to the authors if the truth were told. The text-book does not afford a fit opportunity for the display of literary garnish; and it is the professed *littérateur* who commonly fails most signally as a writer thereof. It is, however, natural for the comparatively unlettered man to write plainly and well about a science or industry in which he is well versed; for his training therein will have inculcated the habit of clear thinking, which is the fountain head of clear writing. Moreover, his intimate and accurate knowledge of his subject will prevent him setting down partial truths; and his whole work will bear rigorous criticism. It must be confessed, nevertheless, that technical or scientific text-books in which the clear writing that comes of sound knowledge and clear thinking prevails, are comparatively few. One which has frequently been instanced as a model elementary scientific text-book is the late Professor T. H. Huxley's "Lessons in Elementary Physiology." Huxley, indeed, has written of himself, "I have been obliged to content myself through life with saying what I mean in the plainest of plain language, than which, I suppose, there is no habit more ruinous to a man's prospects of advancement." But, however damning plain language may have been to his advancement, it enabled him to write a model text-book, and to hold his own in controversy with the foremost representatives of the literary culture of his day.

The "Text-Book of Gas Manufacture for Students" which is now before us, is the third edition of a work originally issued in 1896. The lapse of time since the original appeared renders it futile to compare the latter with the present issue, because so many improvements and novelties have been introduced or adopted in gas manufacture within the last decade. Prior to 1896, inclined retorts were comparatively rare; there were few types of stoking machines in operation for horizontal retorts; coal and coke conveyors and elevators were in an undeveloped state; the works at which cyanogen was directly extracted from gas could be numbered on the fingers; naphthalene extraction by means of oil was unknown; and the vertical retort was undreamt of. These and other novel points which will occur to most readers of the "JOURNAL" afford plenty of new matter for incorporation in a text-book for students. We will indicate the way in which Mr. Hornby has dealt with them, so that our readers may judge for themselves the manner and extent of the introduction of such new matter in the present edition.

No reference to inclined retorts occurs in the index; but, in an appendix, two pages are devoted thereto. We have been unable to find any allusion to them in the body of the work; so that the student may read on until he reaches the last few pages of the book in blissful ignorance that retorts are ever set anyhow but horizontally! Stoking machines for horizontal retorts are dealt with in the fourth chapter, which runs to about seven pages of letterpress. The particulars of the Arrol-Foulis machines are taken from so recent a source as Mr. Tysoe's 1894 paper. West's manual and power machines are also described in this chapter, in equally up-to-date fashion. The index and table of contents disclose nothing more about stoking machines; but nevertheless the aforementioned appendix contains accounts of West's latest compressed-air machine, and the De Brouwer projector and discharger. In regard to conveying and elevating plant, we quote from the same appendix: "It is presumed that the student is already familiar with the method of saving labour in the retort-house by means of coal elevators and conveyors; but special mention must be made of the hot-coke conveyor of M. De Brouwer." Then follows an account of the latter conveyor; but we have been unable to find in Mr. Hornby's text-book any justification for his presumption that the student who has followed him thus far will be already familiar with the method of saving labour by means of coal elevators and conveyors, unless the brief reference to them as appurtenances of West's manual machines can convey the familiarity in question. The index ignores conveyors and elevators. Cyanogen recovery may be dealt with, but we have not observed it, and the index gives no clue to any reference to it. Naphthalene extraction, as practised by Mr. Ferguson Bell, is noticed in an appropriate place; but the vertical retort does not appear yet to have come within the scope of the book.

Mr. Hornby may be able to point out references in his work to some of the matters alluded to which we have been unable to find; but in that case he will prove the better the inadequacy of his index. We think, however, that the student may legitimately demand of his would-be guide that the important matters dealt with in the appendix should have been handled in their proper place in the body of the work. Why should his ideas be confused because the author does not care to put matters in their due and proper place before committing his revised "copy" to the printers? The writer who treats his readers so cavalierly will ultimately find himself deserted by them.

We have not found in Mr. Hornby's book that clearness of expression which we have indicated to be so essential in a student's manual; and we fear that by its perusal much confusion will be induced in the mind of one who goes to it for his first impressions of the processes of gas manufacture. There are many slips, which mar the work. For instance, Sir George Livesey is still "Mr.;" and "the photometers of the present day are all based on a method suggested by Bunsen." Yet an appendix describes the Gas Referees' table photometer, which Mr. Hornby admits is on entirely different lines. The student's lot, under Mr. Hornby, can hardly be regarded as a particularly happy one.

* "A Text-Book of Gas Manufacture for Students," by John Hornby, F.I.C., Honours Medallist in "Gas Manufacture;" late Lecturer on "Gas Manufacture" to the Barking Technical Instruction Committee; Author of "The Gas Engineer's Laboratory Handbook." London, George Bell and Sons; 1905.

PERSONAL.

Mr. ROBERT B. CHALMERS has been appointed Manager of the Alva Corporation Gas-Works, in succession to his father, Mr. W. Chalmers, who died at the end of July. The Council have resolved to consult Mr. A. Yuill, of Dundee, with reference to the appointment of a Clerk of Survey.

The Leeds Water Committee last Wednesday had before them several candidates for the position of Resident Engineer at the Kettlesing tunnel works in connection with the water supply. The vacancy was caused by the retirement of Mr. Malcolm Little, who recently accepted a responsible post under the Indian Government. The choice of the Committee fell upon Mr. RICHARD CHAMBERLAIN, of Corbridge-on-Tyne, who has for some time been Resident Engineer and Works Manager at Whittington tunnel and aqueduct works. The salary is £300 per annum.

Last Wednesday, the students of the Building Construction Classes of the Paisley Technical College presented Mr. L. R. HISLOP, their late Lecturer and Instructor, with a token of their esteem and regard, on the occasion of his leaving to commence his duties as Engineer and Manager of the Berwick and Tweedmouth Gas Company. The gift took the form of a very handsome gold albert, with medallion attached, bearing a suitable inscription. Mr. Hislop, during his period of office in the Paisley Technical College, has had large evening classes in the various stages under his control, the results and work from which have been of a very high order. He was at one period a distinguished student at the college, during which time he gained the National Bronze Medal in Building Construction and the allied Trades.

The Secretary of the Normanton Gas Company (Mr. E. H. Hudson), on behalf of the workpeople, recently presented a copy of Newbigging's "Gas Manager's Handbcok" to Mr. W. GOMERSALL, who is leaving to take charge of the Darenth Asylum Gas-Works, under the Metropolitan Asylums Board. In making the presentation, Mr. Hudson said Mr. Gomersall was not only an old servant but one who was valued by the Directors as well as by the workpeople with whom he had been in daily contact. He trusted Mr. Gomersall's new appointment would be suited to his tastes, and was quite sure he would give satisfaction by his perseverance and devotion to duty. Mr. Gomersall, in replying, said he was pleased to think that his fellow-workers and he had worked together with such harmony.

On his retirement from the service of the Ipswich Gas Company, after a record of close upon fifty years' work with them, Mr. J. T. NOBLE, the Outdoor Superintendent, was recently the recipient of several very handsome testimonials. Mr. D. Ford Goddard, M.P., the Chairman of the Company, presided, and was supported by other Directors and the Engineer (Mr. J. T. Jolliffe); and there was a large assembly of employees. The first presentation was made by Mr. Goddard, who drew attention to the fact that for some years the Company had been sharing profits with their employees. He said that they were paying close upon £400 a year for this purpose. They made provision for sick pay, as well as for pensions; and it was through this arrangement that their friend Mr. Noble was able to retire from the arduous duties of the position he had held so long, and to live the rest of his life, it was to be hoped, in comfort and happiness. All the employees shared in this pension scheme, which had for some years cost the Company £250 per annum. The workmen paid 3d. per week towards it; and this gave them the privilege of retiring at the age of sixty, if they felt so inclined, receiving then a pension of 10s. per week for the rest of their lives. There had been a good deal of talk from time to time about old-age pensions; but instead of talking about it, the Company had acted up to it, and had established a proper—and he thought he might say a generous—system of providing for old age. In regard to the staff, there was a different arrangement; the amount paid being rather larger. The amount contributed by the Company was never less than the sum contributed by the men all the way through. Besides this, they had a sick fund, to which all the workmen contributed

3d. per week, which payment gave them the right of receiving 10s. per week when ill, for a period of 26 weeks. He need scarcely say that, as an economic arrangement, it did not pay to grant such allowances at 3d. per week; but the Company had shared the profits to make it pay, and any deficit had been made up so far by the Company. By these means, they considered that they were handsomely sharing the profits with the employees, whose good, honest work deserved due recognition of this kind. Mr. Noble came into the service of the Company in 1856, as an apprentice to the gas-fitting industry, which was then a most important branch of the work. Things had altered very much since, as large firms now provided stoves, cookers, heating apparatus and various other appliances which the ingenuity of man devised. In the earlier days, all the work had to be done by the gas companies themselves. He believed that the Ipswich Company were almost the first in the United Kingdom to make stoves and distribute them throughout the town. They made all their own cooking-stoves. His father was, he believed, the inventor of the first heating-stove that was ever used; and there was a great run on it for many years. It was known as "The East Anglian Stove." Mr. Noble served as a gas-fitter and inspector for several years, and in 1878 was made foreman of the whole of the works. There he remained until 1894, when he became Outdoor Superintendent. When Mr. Noble entered the service of the Company, the greatest make of gas in any one day in the depth of winter was 180,000 cubic feet, and the price was 5s. per 1000 feet. Last winter the maximum day's make was 2,250,000 cubic feet, and the sale price was exactly half—2s. 6d. This was real progress; and Mr. Noble had borne his share in bringing about this progress. During the whole of his 49 years' service, Mr. Noble had been faithful to whatever duty had been put upon him; and it was because the Directors felt how good a servant he had been that they desired to signalize his retirement by presenting him with a gold watch. Subsequently Mr. Parker, on behalf of the staff, presented Mr. Noble with a handsome oak chimney clock; while Mr. E. W. Hart, on behalf of the fitters, handed him an illuminated address and an aneroid barometer. Mr. Noble, in response, said he felt that he was the recipient of almost too much at once. He need hardly say that he very highly appreciated the valuable presents, not entirely for their intrinsic value, but for the kindly feeling which prompted the gifts. He thanked the Directors and the members of the staff, who had at all times been uniformly kind to him; and he thanked also all employed in the fitters' department, but for whose considerate co-operation the work could not have been carried on as it had been. He hoped that the men would rally round the new Superintendent as they had rallied round him. He desired to thank all who had so kindly recognized his humble services. At the call of the Chairman, the health of Mr. T. J. Brown, Mr. Noble's successor, was drunk with great cordiality; and on the proposition of Mr. Noble a vote of thanks was accorded to Mr. Goddard for his kindness in attending.

OBITUARY.

Mr. Samuel Mullay, who was for many years principal Clerk in the employment of the Edinburgh Gaslight Company, died in Edinburgh on Saturday, the 9th inst. On the occasion of the transfer of the undertaking in 1888, Mr. Mullay retired on a statutory pension of £200 a year. Curiously enough, it was mentioned in this column only last week that Mr. Andrew Dewar, who occupied a similar position in the Edinburgh and Leith Gas Company, and who was also a statutory pensioner of the Gas Commissioners, died on the 1st inst.

North of England Gas Managers' Association.

The Fifty-Seventh Half-Yearly Meeting of this Association will be held at York, on Saturday, Oct. 7, under the presidency of Mr. Matthew Leaf. The meeting will deal with formal business; and the President will afterwards deliver his inaugural address. The members will dine together, on the invitation of the Directors of the York United Gas Company; and subsequently there will be a trip on the river to Naburn Locks.

Eastern Counties Gas Managers' Association.

Intimation has already been made in the "Journal" that the half-yearly meeting of the Association will be held at Cleethorpes on Thursday, under the presidency of Mr. R. G. Shadbolt, of Grantham. The members, on their arrival, are to be received by the Chairman and Directors of the Cleethorpes Gas Company, whose Engineer and Manager (Mr. E. J. Brockway) is the Vice-President of the Association. The Chairman and Directors will be the hosts at a luncheon at the Dolphin Hotel; and the business meeting forms the next item in the day's events. This is to be held in the Council Chamber; and, in addition to the usual formal business, Mr. Shadbolt will deliver his presidental address, and the question of the formation of Commercial Sections is again to be brought forward. The gas-works will be subsequently visited; and, as a special article in the "Journal" of some time since, and a paper by Mr. Brockway of more recent date, have shown, there will be no lack of interest. The members and other visitors will dine together in the evening.

OXIDE OF IRON AS A PURIFYING AGENT,

AND ITS VALUATION AS A RAW MATERIAL AND IN A SPENT CONDITION.

By H. Leicester Greville, F.I.C., F.C.S., &c.

Whatever concessions the gas companies have been able to obtain from our legislature over conditions of testing for illuminating power and exemption from excess of so-called "sulphur compounds other than sulphuretted hydrogen," there is one point on which it may be safely prophesied that no further concession will ever be made—viz., that the gas supplied to the public must be free from sulphuretted hydrogen; that is, practically free, not in an ideal sense of not containing an amount which could not be possibly detected by the most stringent scientific tests.

This condition is only reasonable, considering the facility with which sulphuretted hydrogen can be removed from crude gas by the use of various forms of oxide of iron. The old system of testing was far too stringent; but recent parliamentary regulations have afforded some relaxation. It has always been an anomaly that, whereas the total sulphur in the gas should be permitted to amount to between 17 to 22 grains per 100 cubic feet, the proportion of sulphuretted hydrogen should not have been allowed to reach as much as one-millionth part of a grain. The products of combustion of carbon disulphide and sulphuretted hydrogen are exactly the same with regard to the vitiation of the air by sulphur dioxide; and yet such a wide distinction was made over penalties in the one case and in the other.

Further, the introduction of water gas (a necessity of the exigencies of the gas industry) made it more difficult to purify the gas from sulphuretted hydrogen, to an extent which would pass the most exigent of scientific tests. The light hydrocarbons from the carburetted water-gas plant seem to pass forward through the usual scrubbing and washing appliances, condense in the pores of the purifying material, and partially neutralize the completeness of the usual chemical reactions which might have been expected under normal conditions. All this rendered some relaxation of the system of testing more necessary.

The elimination of sulphuretted hydrogen by means of revivified gas liquor in closed vessels, is an ideal which will probably never be completely realized, although I have no doubt that the bulk of this form of impurity may be removed in this way. The main fact remains that, for keeping gas free from sulphuretted hydrogen, some form of oxide of iron is the best to employ; and of all forms of oxide of iron that known as "Bog Ore"—containing hydrated ferric oxide deposited on a peaty basis—is the most efficacious. I am quite aware that "Weldon Mud" and other materials have been advocated as substitutes; but, from long experience, I am still of opinion that native bog ore is, from many considerations, the best material if it can be secured at a favorable price.

Natural deposits of bog ore exist in large quantities in many localities, British and Continental, but of varying qualities. A material rich in iron may be considered unsuitable on the ground of a high percentage of inert matter of a siliceous or aluminous character, the use of which may be considered undesirable by a competent gas manager on the ground of throwing an undue amount of back-pressure on the purifiers. This difficulty can, of course, be mitigated by an admixture of sawdust, or cocoanut fibre refuse, but with the penalty that the efficiency of the material is reduced, and the period of its active life limited.

In purchasing oxide, the ordinary common-sense gas manager can estimate the ratio between the price of the material and its probable efficiency, based on an accurate analysis. A specification for purchase which I recommended some years back, and which was adopted by a large gas company, was as follows—

Not exceeding 50 per cent. of water
Not exceeding 2 per cent. of siliceous matter
Not less than 60 per cent. of Fe_2O_3, on the dry basis

A typical sample of a good Irish bog ore gave the following results on analysis:—

Moisture per cent.	45·2
Siliceous matter	2·0
Organic matter and combined water	19·5
Oxide of iron, Fe_2O_3	33.0
	99·7

Percentage of F_2O_3 on the dry basis = 60·2

Though the usual method of analyses of bog ore is probably well known, it may not possibly be without interest to describe the process which I have adopted for many years. Where a large number of samples have to be dealt with, there is no doubt that a volumetric method for the determination of ferric oxide would save a considerable amount of time.

The ordinary process is, however, as follows: A weighed quantity of the sample is dried at 212° Fahr. The loss is registered as "water" or "moisture." The residue is then ignited, and the loss registered as "organic matter and combined water." The ignited residue is next digested in strong hydrochloric acid, with the addition of a few drops of nitric acid, until all the ferric oxide has been dissolved—judged by the insoluble matter being free from any red colour. The solution is then diluted, and filtered; the insoluble residue, after complete washing being ignited and weighed. A portion of the filtrate is precipitated

with ammonia, and the precipitate washed with hot water and ignited and weighed. The ignition should be made with a cover over the crucible, as during the transition of the ferric hydrate to anhydrous ferric oxide, what is termed "decrepitation" takes place. This means that a proportion of the precipitate which should be weighed is projected and lost.

It is sometimes a practice to precipitate the ferric oxide in hot solution with excess of sodium hydrate, with the view of eliminating any alumina present. If this course of procedure is adopted, the precipitated ferric hydrate should be dissolved in dilute hydrochloric acid and reprecipitated with ammonia. This precaution is most necessary, as it is almost impossible to thoroughly wash the precipitated oxide free from soda. Basic salts are formed, which are not entirely decomposed by hot water; and an error might thus arise, giving an exaggerated proportion of ferric oxide in the sample tested. I have never found a weighable proportion of alumina present in samples of bog ore; and I therefore always adopt the method of precipitation by ammonia in preference to the use of soda.

There is one question over the valuation of bog ore for gas purification purposes which has been under my consideration for some considerable time. That is the question of what is the real composition of hydrated oxide of iron. The question is one of serious commercial importance. I was consulted a short time back by a Continental firm, who guaranteed a certain percentage of hydrated oxide of iron. The consignment was to a gas company in this country. The Continental firm was under the impression that the formula for hydrated oxide of iron was Fe_2O_3, $3H_2O$; but the manager of the gas-works insisted on the acceptance of the formula $Fe_2O_3H_2O$. This led to a dispute over which I had to arbitrate, and I made an investigation.

In the first place, it was necessary to ascertain what the composition of artificially prepared oxide should be. For this purpose, a solution of ferric chloride was treated with ammonia. The precipitated ferric hydrate, after a thorough washing with distilled water, was dried at 212° Fahr. The loss on ignition amounted to 13·6 per cent. This fairly corresponds to a formula of $2Fe_2O_3$, $3H_2O$, which theoretically requires 14·4 per cent. of water. This seems to indicate two things. The one is that the claim of a formula of Fe_2O_3, $3H_2O$ is untenable; and the other is that the formula of $Fe_2O_3H_2O$ is equally untenable. A reference to Watts's "Dictionary of Chemistry" has afforded me the following information:—

Composition of Artificial Oxide by Precipitation.

Fe_2O_3, $2H_2O$.
Fe_2O_3, $3H_2O$.
$2\,Fe_2O_3$, $3H_2O$.

Natural Oxides.

1. "Gothite," $Fe_2O_3H_2O$.
2. Limonite, $2\,Fe_2O_3$, $3H_2O$.
3. Xanthosideride, Fe_2O_3, $2H_2O$.
4. Bog ore from Russia, Fe_2O_3, $3H_2O$.

The percentages of water in the natural bog ores would come out as follows:—

$Fe_2O_3H_2O$ = 10·1 per cent.
$2\,Fe_2O_3$, $2\,H_2O$ = 9·8 „
$2\,Fe_2O_3$, $3\,H_2O$ = 14·0 „
Fe_2O_3, $3\,H_2O$ = 24·5 „

The percentages of the various hydrates corresponding to 100 parts of Fe_2O_3 would be as follows:—

For $Fe_2O_3H_2O$ . . . 107·2.
„ $2\,Fe_2O_3$, $2\,H_2O$ . . . 110·0.
„ $2\,Fe_2O_3$ $3\,H_2O$ . . . 116·3.
„ Fe_2O_3, $3\,H_2O$ . . . 132·5.

Watts's "Dictionary of Chemistry" states that "ferric hydrate gives off part of its water between 80° and 100° C., and the whole at a red heat; it is also completely dehydrated by heating it to 160° to 200°, with a saturated solution of chloride of calcium or chloride of sodium."

I have made some experiments on natural bog ores dried over sulphuric acid in a desiccator until no further loss ensued, and subsequently exposed to a temperature of 212° Fahr. In all cases there was a loss, proving that a hydrate existed which was at all events partially decomposed at a lower temperature than 212° Fahr. Probably the hydrates were of different composition—some being unstable between the ordinary atmospheric temperature and 212° Fahr., and others not decomposing until exposure to a temperature of over 212° Fahr.; the final decomposition possibly occurring at a low red heat. This, at all events, establishes the fact that hydrated ferric oxides exist in natural bog ores which have a higher percentage of combined water than is even represented by the formula of $2\,Fe_2O_3$, $3\,H_2O$.

This much is certain, that the restrictions over ordinary sulphur compounds being abrogated, gas companies are no longer bound to compulsorily remove carbon dioxide from their gas. This question is, therefore, now entirely optional. Where lime had to be used, a more or less proportion of sulphuretted hydrogen was removed by this material; but under present circumstances, the whole onus of the removal of sulphuretted hydrogen depends on the use of oxide of iron, and therefore the correct valuation of this material has become of increasing importance.

With regard to the spent material, after repeated use. The usual practice for valuation is to ascertain the percentage of moisture by drying at 212° Fahr., and subsequently thoroughly exhaust the residue of free sulphur; the proportion of sulphur being ascertained by the evaporation of the solution. I have for some time past practised a more expeditious method. Fill a 250 cc. flask, having a fairly long neck, with carbon disulphide; and then drop in 250 grains of the spent oxide previously dried. Shake up for a short period, and then start filtering. It takes but a few minutes to pass 100 cc. Without waiting for the whole filtrate to pass or to wash the residue, the 100 cc. (representing 100 grains of the sample) is evaporated, and the percentage of sulphur is at once ascertained in the smallest possible time.

The following example will show that my method is as accurate as it is simple:—

Total exhaustion process—
Sulphur per cent. . . . . 45·53.
My process—
Sulphur per cent. . . . . 45·50.

I trust that this information will be of interest to your readers.

COMMERCIALISM AT GAS ASSOCIATIONS' CONVENTIONS.

By Lucius S. Bigelow, of New York.

[From a Paper presented to the Pacific Coast Gas Association.]

This topic is indeed an important one; for is it not so, that in the commercial or sales-promoting side of the industry lies much of its dividend-earning capacity?

The gas enterprise of to-day is largely composed of two distinct divisions: First, the manufacturing, which naturally includes distribution; and, second, the selling. To the first, I should says belongs the duty of producing the element, providing holders and piping-systems through which to deliver the gas. These are purely engineering propositions. How shall we dispose of the gas after it is in the holder? That is the question which the commercial or sales-division must answer.

For years there have been Gas Associations—they were started when the gas companies confined themselves to the making of gas, coke, and tar. These Associations have done much to cultivate skill in the various branches of gas engineering, and to hasten the introduction and use of more modern methods in gas manufacture, as well as the adoption of approved means for delivering the product under high pressure and to far-distant points. Thus the original plan and intent of these Associations (so I am told) has been, and is being, well fulfilled.

In these later days, the industry is confronted with an added responsibility—namely, a commercial or sales-promoting side. In this connection, many gas companies have already assumed the responsibility of becoming merchants, in that they buy and sell gas-ranges, burners, mantles, water-heaters, and other devices and supplies. In some cases, this has been done to the extent of creating considerable friction between local hardware, stove, and other merchants and the gas company. Other companies are also energetically doing extensive sales-promotive work, but are so conducting their campaigns as to throw the sales into the hands of the local merchants, thus directly co-operating with them for the purposes of harmony and the enlisting of their assistance, and through them, the aid of their friends, during present and future periods of extensions, &c. There are other gas companies that are doing neither—seemingly quite satisfied with what business they can secure without ever "going after it." Here are three ways now followed, and there are doubtless many others. The question arises: How are we to discover them, and how are we to judge which of the many is the best method under certain conditions?

Some companies advertise largely in the local papers, to gain publicity and favours; some do no, or very little, advertising; others, employ a goodly number of solicitors to visit personally every house and shop in the territory. Again I ask: Which is the best way?

While few plans *in toto* will work well in all towns or cities, modifications thereof are frequently found both adaptable and profitable. On the other hand, listlessness or apathy on the part of a gas company can never hope to bring it clever results. Such, too, is a retarding element in the enterprise at large, and should be dispelled.

There are many commercial methods in vogue here and there with gas companies, that if put into active service by others not using them, would bring most surprising returns to their coffers. How can we learn of these and other methods, and how may we ascertain more about the results enjoyed by those adopting them? Also, How may we dispel apathy in the fraternity?

These questions lead directly to the subject before us; and I would suggest as an answer: Let every gas company in the United States that is willing to give and take ideas, send a clever commercial representative to such Gas Association Conventions, from year to year, as shall present the largest opportunity for consultation, agitation, and interchange of ideas, plans, and experiences along commercial lines. The stay-at-home man or company never prospers, nor helps others to the fullest extent.

I have been asked, "Can any gas company afford to send a

representative to a considerable distance to attend a convention giving its especial attention to commercial gas matters?" My response is, "Can any gas company afford *not* to send such a one?" Suppose it should cost a company $100 or $200, or more, to send an "Absorbent" (as I might term him) that would return full of ideas, which, put into practice, would increase the sales of gas by several thousands of dollars a year, Would the investment be a profitable one?

Gas companies, as a rule, differ from other merchants in that they have nothing along promotive or sales lines to conceal from one another. Herein great virtue lies, and exceptional possibilities present themselves. Such being the case, "the other man," is sure to get fully as much as he gives; sometimes more.

A convention is the natural place for personal touch. It is a great clearing-house for ideas. The very thought, under such conditions, of a company saying "We can't afford to send our man," seems indeed absurd.

Let me ask, Can we get too much commercialism or can we consider and exchange too many sales-promotive ideas and plans at a gas convention? I say "No!" Yet a great difficulty has existed throughout the past, in that there have not been hours or sessions enough in the older Association conventions that could be devoted to this commercial side of the industry, in order to do it full justice, without seriously pruning down the number and length of the many important engineering subjects that naturally present themselves.

It was the existence of such a condition which led me last November to suggest through the columns of my magazine, "Light," that there should be a National Commercial Gas Association, at the meetings of which naught but sales, appliances. business conduct, gas advertising, and other similar commercial subjects should be presented or discussed. The plan recently came to fruition and the Association is to-day in operation, with Mr. William J. Clark, of the Consolidated Gas Company of New York City, as its first President. Its first convention will be held in New York next January. Over fifty gas companies (some of the largest in the country) are already represented in its rapidly growing membership. I hope to see most genuine co-operation between the older Association and this newer one, that has a special work before it in this, its especial field. There is, as you see, not even a thought of Association competition in its make-up. It is simply the dividing of work, whereby to gain the largest returns for the gas enterprises of the United States.

There has, heretofore, in most of the convention programmes, been exceedingly little commercialism. This brief treatment of so important a matter cannot hope to bring best results to the industry, while on the other hand—collectively produced, and considered at one convention—these various commercial subjects will afford all in attendance a most clever opportunity to absorb a maximum amount of beneficial and valuable sales-promotive information. "In union there is strength."

I have thought that should the old Associations or certain of them unite and form one splendid Institute of Gas Engineers, or a National Gas Engineers' Association, which would be a parallel of the American Institute of Mining Engineers—of which type of Association there is but one in the United States—that then we should have one Institute of Gas Engineers of the United States, or National Gas Engineers' Association, and one National Commercial Gas Association, and that the meetings of both might be arranged as follows: Select five days, once a year. Set apart say the first two of the five for the sessions of the Gas Engineers' Association, which would be conducted for and by engineers, and under its own organization. Take the last two days of the five, for the convention of the Commercial Association, which would be conducted under its own rules and by men representing the commercial side of the industry. Thus you have so organized and officered both of your Associations as to secure the best results in a most systematic and satisfactory manner. Professional men prefer to be officered over and controlled by professional men and rules, while business men like commercial control and guidance. It is quite natural.

By this plan you will get the active help and services of not a few very clever men who have till now taken little or no interest in Gas Association matters. The plan I suggest sets the middle day of the five apart, as a day for social intercourse, excursions, banquets, and the like, in which all—the engineer, the business man, and the appliance or supply man—should join.

Note how this would economize in both time and expense. The man desiring to hear only the papers and discussions upon engineering subjects, and enjoy the social functions, would come for the first three days, and would hear and secure all (and only) what he came for; and he could then, without wasting time, return home. The business or commercial man, who might wish for only the commercial or sales-promoting subjects, could remain in his office at home till just in season for the last three days. And the man who might wish to hear all, could stay entirely through the five days. In these busy, strenuous days, the man who is purely an engineer, or the exclusively business man, feels in many cases an inability to spare more than just sufficient time to absorb his especial subjects.

This plan would meet all conditions. If the idea suggested were adopted, I can then see a means of having once each year a fine national display of the latest equipment, supplies, and appliances required in the construction and sales-end of the industry. A large assembly room could well become the scene of a most interesting exhibition that would attract the public during certain hours—thus stirring up that city for gas, and during certain other hours afford the gas men an opportunity to actually see, and have explained to them, many a device which otherwise they would know of only by advertisement, circular, or word of mouth of a travelling representative.

The exhibition of devices, &c., could open with the first of the five days and remain open until the close of the fifth. It should be under the control of the Commercial Gas Association, not of the appliance man—thus to avoid competition for "plums" and the obscuring of the man with lesser "pull" or power among his fellow-manufacturers, yet who may have a device that the gas man believes in, and which should enjoy equal prominence with the rest. Every man exhibiting would naturally want the best he could get, and he would be apt to crowd his competitor, if the manufacturers controlled the exhibition. So, as I have said, it would be well to have the exhibition each year under the control of the Commercial Gas Association. I believe you cannot have too much commercialism; but I also firmly believe that there should be a place for it, when and where it will not crowd the important engineering subjects, or be crowded itself.

HYGIENIC ESSENTIALS IN GAS-FIRES.

Reference was made in the "JOURNAL" report of the proceedings at the recent meeting of the German Association of Gas and Water Engineers (*ante*, p. 38) to a communication by Herr F. Schäfer, Engineer of the German Continental Gas Association at Dessau, on the hygienic conditions of heating by gas; and a fuller account of it was promised later. The following is an epitome of the paper, excluding the more controversial portions which have no direct reference to English conditions.

The authorities in Germany, more than in any other civilized country, endeavour, by prohibitions and regulations, to remove dangers to life, health, and property, and to enforce improvements which, while generally real, are at times quite imaginary. Of late years the gas industry has become the victim of this zeal, as instances of regulations which have been promulgated at Hamburg, Strassburg, and elsewhere, under erroneous impressions of the authorities, indicate. These regulations have been removed through the energetic action of members of the German Association of Gas Engineers. Recently, however, a greater blow has been aimed at one branch of the gas industry through the medium of Privy-Councillor Professor Rietschel, who delivered an address at the Congress of Heating and Ventilation Engineers at Dresden in July, 1903, in which he recommended certain safety provisions for heating installations. He embodied these provisions in a code of eight rules, of which the last three refer to heating by gas, and are as follows:—

6.—Gas-stoves with non-luminous flames and those with downcast flues are not to be used.

7.—The exit-flues for the products of combustion of gas-stoves must discharge at least 5 feet above the ridge of the roof, and be provided with deflectors.

8.—The exit-flues for the products of combustion must not be situated against the outer walls.

These rules, obviously and admittedly, are calculated to make the use of gas-stoves difficult, and in very many cases impossible; and as they are intended to serve as a model for enactments, they clearly constitute a grave danger to the gas industry. The danger is a very real one, on account of the high authority of Professor Rietschel. The author approached the President of the German Association of Gas Engineers with a view to the Heating Committee of the Association taking steps to combat the statements made; and the matter was taken up by the Committee. A manifesto prepared by the author was approved (in a somewhat softened form) by the Committee, and published. The leniency was found, however, to have been misdirected; for the manifesto was printed in the "Gesundheits-Ingenieur" with comments by Herr von Boehmer, one of the Editors. In these comments it is contended that Professor Rietschel's rules Nos. 7 and 8 must be generally recognized by builders, and be only departed from in exceptional cases, so that failure to comply with them in the majority of instances could be dealt with as a penal offence under an existing law, which enacts that anyone who departs from the generally accepted rules of building, and thereby endangers someone, shall be liable to a fine or imprisonment. It will be seen that proceedings could be instituted under this section without the promulgation of any new regulations, and without the actual occurrence of an accident. It is instructive to note how Herr Rietschel's suggested rules have been adopted, in face of the protest of the Committee, by Herr v. Boehmer as recognized building rules, to ignore which is to incur a penalty. The author thought the conciliatory attitude of the Committee was a mistake at the time; and he has already made a protest against the deductions of Herr von Boehmer. He proposes, however, now to subject the rules of Herr Rietschel to a categorical criticism.

Herr Rietschel has given no detailed statement of the reasons for his rules; contenting himself, both in his paper and in the discussion on it, with a few vague generalities. One is forced to the

FIG. 1.

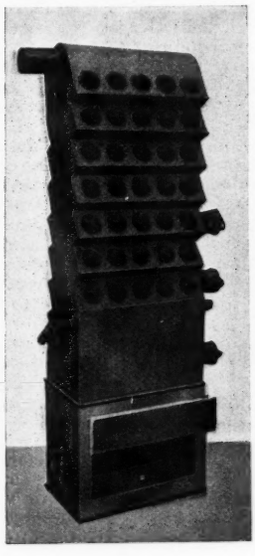


FIG. 2.

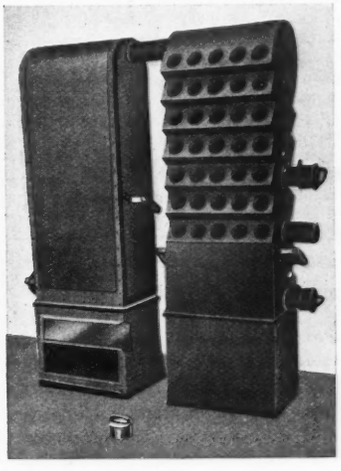


FIG. 3.

conclusion that the observations and experiences on which they were based were obtained on apparatus either objectionable in itself or badly installed, and that he is ignorant of many of the most prevalent gas-stoves, and knows less about the removal of the products of combustion than the practical makers and fitters of the stoves. The first of the three "rules" in question relates to the construction of gas-stoves, and would henceforth permit only stoves with luminous flames and with upcast flues. Thus all gas-stoves made with bunsen flames, as well as those having downcast flues, would be prohibited. So far-reaching a rule must be supported by overwhelming evidence that it is well founded, and that it will actually result in enhanced safety. Now, Rietschel in his paper supported this rule only by the following statement: "Non-luminous flames are extinguished more readily than luminous flames. As the heat evolved is the same for both, but the luminous flame is less intolerant of control, only luminous flames should be used with gas-stoves." In the discussion, he supplemented this by saying: "A gas-fire is very easily extinguished, even by merely stopping-back the chimney gases. The flame goes out from want of oxygen; and with non-luminous flames there is no intimation that the fire is out, and hence an explosion may easily ensue."

These statements are, of course, only partial and conditional. Many stoves, even with bunsen burners, are not extinguished by stopping-back, or even by a backward rush of, the chimney gases, as may be seen from several types exhibited by the author. The flames are out of view in only a few little-used stoves with bunsen burners. With most patterns accidental extinction of the flames would be at once evident, as they serve to keep refractory bodies red hot. It will be seen that a stove of this kind, which is that now generally preferred in England (as shown in fig. 1) lights up brightly, and that if the flue-pipe is entirely closed by a cap, thus stopping-back the products of combustion, the flames are scarcely even affected, and certainly are not extinguished. If, further, a powerful down-current is caused by blowing air down the flue-pipe, the flames are not put out. On turning off the gas, it will be seen, by the rapid cessation of incandescence, that the extinction of the flames would be detected at once. The lighting-back of the bunsen flames causes a distinct change, which would be forthwith observed. It is evident, therefore, that this widespread type of gas-fire does not give any support to Herr Rietschel's contentions and alarms.

Gas-fires working with luminous flames, and having upcast or downcast flue-passages, require somewhat fuller consideration.* Herr Rietschel, in his paper, points to the danger from these stoves being—firstly, the escape of the products of combustion into the room and the risk of poisoning therefrom; and, secondly, the chance of explosions occurring. Now, only in a few types of gas-stoves is the flame stifled if there is insufficient escape for the products of combustion; and in the majority the flame is not extinguished, even if there is a back-rush of flue gases. These stoves are, therefore, not liable to cause explosions. The upcast-flue, which Herr Rietschel would allow, is, however, no guarantee that the flame may not be stifled and extinguished. Some gas-fires with upcast-flues are readily extinguished, while others having downcast-flues also are not put out even when the outlet-pipe is completely closed. If the combustion is incomplete, however, there is danger of poisoning from the carbonic oxide when the products are driven back into the room. The types of stove which are free from objection are those therefore which, under all conditions, afford complete combustion, and in which extinction of flame can never occur. Such types are excluded by Rietschel's No. 6 rule, while dubious types are permitted. These facts may be readily demonstrated by aid of the experimental stove and chambers shown in figs. 2 and 3. If the body is mounted on the burner-base, as in fig. 2, the exit gases rise upwards, and escape more or less cooled through the lateral outlets. This would be admissible under Rietschel's rules; yet it is a most dangerous type, because, if the outlets are closed, the flames at once become unsteady, reddish, and enlarged, and finally all, or most of them, go out. There is thus first incomplete combustion, and ultimately the production of an explosive mixture through escaping gas.

If, however, the same body is mounted on a false base, and the large chamber put on top of the burner base and connected with the first body, as shown in fig. 3, the whole forms a stove with an upcast and a downcast-flue. The cooling of the products occurs chiefly in their downward course; and they finally escape near the bottom. The positive pull of the first large hot chamber is greater than the retarding effect of the second cooling chamber; and the stove behaves well, though it would be precluded from use by Rietschel's rule. If the outlet is closed, the flames become a trifle unsteady, but do not go out. Actually the products then escape down the front of the first large chamber, and by the glass screen in front of the burners. No doubt, however, the products contain some, though not much, carbonic oxide. But if the glass screen is removed, so that the products can escape at a slightly higher level than the burners, the flames at once become stiff and quiet, indicating that even with the flue closed there is complete combustion. Thus, even if a chimney is not drawing at all, the effect of the stove on the air of the room is only the same as that of a couple of incandescent gas-burners. The combination of the upcast and downcast flues is almost as old as the gas industry, having been first adopted by Dr. Bond, of Gloucester, in the sixties, and since applied in bath-heaters and the Junkers calorimeter. The second important point in the construction of stoves of this type—viz., the arrangement of the edge of the front of the burner-chamber above the level of the burners—was insisted on by Herr A. Buhe, of Dessau, more than twelve years ago. The latter Engineer acted, in his work in designing gas-stoves, on the assumption that the chimney with which they would be connected would not draw, and that the stoves must work without causing danger under such conditions.

Rietschel's rules Nos. 7 and 8 refer to the disposal of the products of combustion; and if they became enactments, they would make the application of gas for heating more costly and more troublesome, and in many cases impossible. The projected rule No. 7, as to the products being discharged above the level of the ridge of the roof, could not be complied with in many buildings; and the majority would be injured from the æsthetic standpoint. The question must be asked whether such a rule is required, and if there is adequate reason for it. There is no ground for believing that it would result in a better removal of the products, or would prevent their being driven back at times. As a fact, the regulation cross-section of chimneys is too large for gas-fires, and reduces the rate of flow of the products unduly, and thereby cools them too much. Lengthening the chimney would induce still more cooling, and the draught would be spoilt. A long chimney

* As, however, they are a type comparatively little used in England, though common in Germany, this portion of the author's paper has been much abbreviated.—ED. J.G.L.

answers better for ordinary fires, but a short one is best for gas-fires, as those who have had to put the same type of gas-fire in rooms on different floors of a house know well. The products are less voluminous and less hot from a gas-fire, if the latter is constructed to afford a high duty. Hence the adoption of Rietschel's rule No. 7 would result in the conditions being injured rather than improved. The author found, by observations with a differential pressure-gauge and a delicate anemometer, that the draught was much better in a chimney 28½ feet long than in one 50 feet long, when the same gas-fire was in use in the two. The author has also in his house flues of gas-stoves having the reasonably small cross-section of 10 to 11 square inches, which only project 20 inches above the ridge of the roof, have no deflectors, and are placed against the outer wall. Yet during the past winter, which was exceptionally stormy, these gas-stoves behaved perfectly. It therefore would be absurd to regard Rietschel's dicta as recognized building rules, as has been proposed by Herr von Boehmer.

THE KETTERING WATER-WORKS.

On the occasion of a meeting of the Association of Municipal and County Engineers recently held at Kettering, under the presidency of Mr. W. Harpur, M.Inst.C.E., of Cardiff, Mr. T. READER SMITH, the Surveyor to the Urban District Council, read a paper on "The Kettering Water-Works and the New Storage Reservoir." The following is an abstract of the paper.

The water-works acquired by the Kettering Urban District Council in 1898 included a storage reservoir of 160 million gallons capacity near the village of Cransley, with a gathering-ground of 1805 acres; and the water available for the town was 546,795 gallons a day. There were also two well pumping-stations, equal together to 110,000 gallons daily—making 656,795 gallons. The population was then about 28,000, and the number of water consumers 17,315. The daily consumption being 485,820 gallons, there was a surplus of 170,975 gallons, which with an annual increase in the daily consumption of 40,000 gallons would not last more than four years. The following year the Council sought the advice of the late Mr. James Mansergh, who recommended the construction of reservoirs in the two valleys immediately adjoining the present gathering-ground; the sites selected being at such levels that the water would gravitate to the works at Cransley, where the filtration and pumping would be done. According to the calculations made, the total available water supply would then be brought up to 1,177,166 gallons.

In 1900, the Council went to Parliament to obtain the necessary powers to construct the works advised by Mr. Mansergh. They comprised the two reservoirs referred to—one (the Orton) to have an embankment 27 feet high, a capacity of 90 million gallons, and a top-water level of 360 feet above Ordnance datum, with a main delivering the water at the other reservoir (the Thorpe), which was to have an embankment 46 feet high, a capacity of 140 million gallons, and a top-water level of 335 feet, the delivery main from this to convey the water from both reservoirs to the Cransley reservoir, which has an embankment 32 feet high, a capacity of 160 million gallons, and a top-water level of 298 ft. 6 in. At these works there were three filter-beds, each of 500 square yards area, and a pair of Worthington pumping-engines, each of a capacity of 500 gallons per minute, or 720,000 gallons per day for 24 hours' continuous pumping, delivering the water to the town through a 12-inch main, 4400 yards in length, the working head against the pumps being about 70 feet. Mr. Mansergh's scheme further provided for two additional filters, a filtered water tank of 100,000 gallons capacity, and additional pumps at Cransley; a high-pressure tower with a tank of 100,000 gallons capacity in the town at Clover Hill, to improve the pressure at the higher parts, with a pump for supplying it from the present service reservoirs, and new trunk mains arranged to serve the town in three separate districts—one being high level and two low level. The estimate for the whole was £126,500.

The Bill, which cost the Council £3291, received the Royal Assent in July, 1901. The author quoted some of the clauses, and referred particularly to one (34) which he thought was new in a Water Bill. It was drawn to give the Council the same control and power of inspection for water services that the Public Health Act, 1875, gives for drains; the point being that there is nothing in the Water-Works Clauses Act which empowers an authority to insist that water services shall be inspected before being covered up. The Council had previously proposed a bye-law to this effect when submitting their bye-laws to the Local Government Board for their sanction; but it had been struck out as *ultra vires*. The section in the Act was as follows:—

> The provisions of section 37 of the Act of 1898 with respect to bye-laws, shall extend to enable the Council to make bye-laws for the inspection by the Council of any service-pipe, or any apparatus connected therewith, intended to be covered over, before the same is covered over; and the Council may, by such bye-law, require notice in writing to be given to them as soon as such pipe or apparatus is ready to be covered over, so that the same may be inspected.

The price to be paid by the Council for the water-works was determined by arbitration—the amount of the award being £127,880; and when to this were added the Water Company's mortgage debt, the expenses of the Act and of the arbitration and winding-up of the Company, compensation to the officers, and legal expenses, the total cost became £148,111 for works on which the total capital outlay by the Company only amounted to £72,025. This heavy expenditure, together with a further outlay of £40,000 to which the Council were committed for electricity works in order to avoid the loss of their Provisional Order, made them anxious to delay the new works of water supply as long as possible. But the exceptionally dry year of 1902 made it evident that more water must be provided; and in November of that year they decided to undertake the construction of the Thorpe Malsor reservoir (that being the nearer of the two to their existing works at Cransley), and appointed the author as their Engineer to design and carry out the works. They comprise an embankment, with culvert under, valve-tower, overflow weir and waste-water channel, and a culvert bridge at the upper end of the reservoir, including the raising of the road crossing the stream there to keep it well above the top-water level of the reservoir which will back up to this point. Arrangements had also to be made to supply the village of Thorpe Malsor with filtered water, as compensation for the loss of their existing supply of spring water, by a ram working in the valley on the site for the new reservoir, and which would be drowned when impounding the water by the new works; also for the diversion of the drainage of the village of Loddington, situated a mile above the new reservoir embankment; and a caretaker's cottage to be built at the entrance to the site.

After these introductory remarks, the author proceeded to give a detailed description, by the aid of drawings, of the various portions of the works. The site is three miles out of Kettering, in a valley very suitable for a reservoir, being deep, with steep sides. The embankment will be 840 feet long at the top and 46 feet high at the centre. The width at the top will be 12 feet, the inner slope 1 in 3, and the outer one 1 in 2¼ for the upper half and 1 in 2¾ for the lower, with a level benching 4 feet wide at the junction of the two slopes. The culvert for the draw-off pipes is placed in a trench under the embankment, cut in the ground part of the way up the north side of the valley, so that it is completely enclosed in the solid ground, and protected from stresses arising from settlement of the bank. It is of horseshoe section, 6 feet in diameter, constructed of two rings of brickwork in cement mortar (one part cement to two parts sand), with a rendering of cement mortar ½ inch thick between the two rings. The inner end of the culvert terminates at a valve-tower situated just inside the toe of the inner slope of the embankment. The position was determined by the draw-off valves for the main to Cransley, which are placed at 12 feet, 24 feet, and 36 feet respectively below top-water level—the arrangement being that the bottom draw-off, together with the compensation draw-off which is 3 feet lower, is placed in the forebay channel at the foot of the tower, while the next draw-off in the side 12 feet higher is just above the pitching on the slope of the embankment.

Having described the bridge to the valve-tower, the overflow and waste-water channel, and the meter and gauge house for the supply to Thorpe Malsor, the author gave some particulars of the delivery main. The water from the Thorpe reservoir is conveyed to the Cransley works for filtration and pumping by a 15-inch main, 4050 yards in length, which is laid down the valley below the new reservoir to its junction with the valley in which the Cransley reservoir is situated. There its course turns up to these works, where it delivers the water into the reservoir just beyond the southern end of the embankment. As the overflow level of the new reservoir is 335 feet, and of the Cransley reservoir 298 ft. 6 in., above datum, there is a good head to force the water round. This main was laid in 1902 and 1903 by direct labour, without a contractor. The maximum pressure at its lowest point will, under present conditions, be 98½ feet, which will be increased to 123 ft. 6 in. when the Orton reservoir is connected. The cost of the main was £4208.

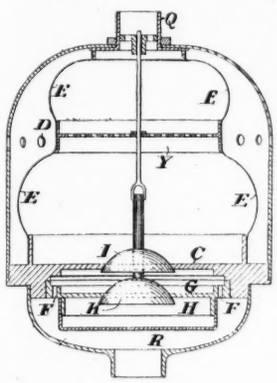
Among the works sanctioned by the Council's Act are additional filters at the Cransley works as they become necessary. When the water-works were taken over by the Council, there were three filters, each 500 square yards in area; and as the daily consumption continued to increase, the rate of filtration soon became close upon 3 gallons per square foot per hour for two filters working, so that it was thought wise to increase the filtration area by adding another filter. For convenience in working, the same area of filter was adopted; and the ground adjoining the existing beds was laid out for four new filters, one of which was then constructed. The details differ somewhat from the three old beds. These have each a centre drain fed by side drains, 10 feet apart, surrounded and covered by rubble filling to a depth of 2 feet, with two layers above of 1 inch and ½ inch granite, each 6 inches thick; the latter covered by a bed of sand 2 feet thick, the depth of water above being 2 feet. Ventilators are taken up through the sand bed from the head of each side drain. The construction of this filter was carried out by direct labour, and it cost £1243. The cost of the alterations in the water service to the old beds was £366; making a total expenditure of £1609.

The construction of the Thorpe reservoir was commenced in September, 1903, and it should have been completed by the end of last March. It was delayed by the wet season; but it would have been completed early in August had it not been for a subsidence of part of the embankment between the valve-tower and the south end, which occurred at the end of May last.

REGISTER OF PATENTS.

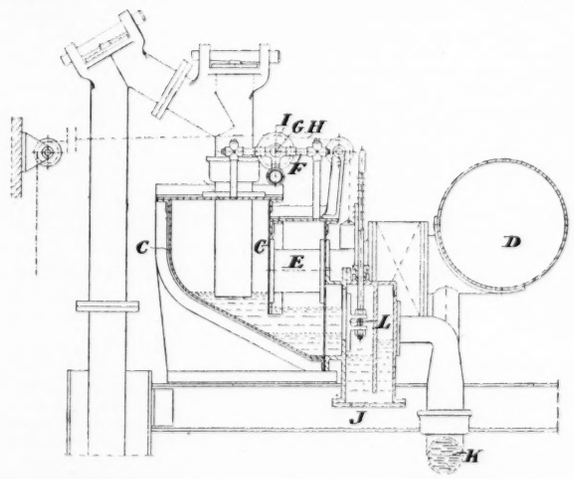
Governors for Gas-Burners.—Child, J. F., of Idol Lane, and Francis, A. S., of Farringdon Road, E.C. No. 17,982; Aug. 18, 1904.

According to one way of carrying out this invention, the governor is contained in a casing divided into two parts by a partition having a valve-seating therein. The upper part of the casing is provided with holes D to admit the entry and exit of the air. Beneath the partition are formed certain chambers, one of which R is open to the gas supply, and connects by a number of ducts F with the chamber or valve casing G just below the partition. Below the valve-seating in the centre partition is another valve-seating in the bottom of the chamber G, which latter valve seat communicates with a chamber or valve casing H below. Two valves I and K, mounted on a spindle L, are provided—the spindle connected by a perforated plate N or bridgepiece having an annular flange or ring Y to the flexible double chamber or bag E about the middle. The gas enters the chamber G below the upper valve I by the holes F, and exerts an approximately equal pressure on both valves I and K by reason of its tendency to open the lower valve and close the upper one—the area of the valves being more or less equal. The gas passes between the upper valve and its seat into the flexible chamber E, and through the lower valve K to the bottom chamber H, whence it also rises through the hollow valve spindle L to the flexible chamber E, and thence to the burners through the fixed tube Q at top. The pressure in the flexible chamber E and in the chamber H (in which the lower valve seats itself) must always be the same, owing to the connection between them by the hollow valve spindle; and "there can consequently be no practical difference between the pressure at any time exerted on the top of the upper valve I and the pressure under the lower valve K."



Regulating the Seal of Hydraulic Mains.—Johnston, A. A., of Ilford. No. 19,222; Sept. 6, 1904.

This invention relates to means for regulating the level of the liquor within a hydraulic main (so that the dip-pipes may be open or lightly sealed to any desired extent while gas is being made, but may be closed or the seal increased while the retorts are open for drawing and charging) by providing "a suitable source of gaseous pressure, terminating in a valve-controlled bye-pass, passage, or pipe, joined at its ends either to the upper parts of an undivided hydraulic main and a separate vessel, or joined at its ends to the upper portions of a divided hydraulic main."



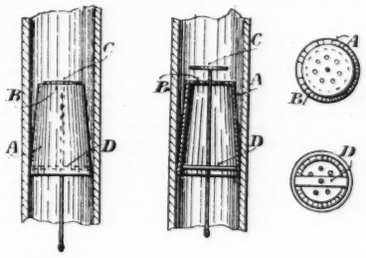
The hydraulic main shown is divided into two parts by a depending plate C, the lower edge of which extends well below the upper surface of the liquid in the main. The dip-pipes extend into the part of the hydraulic which is connected to the foul main D by a junction-piece E. F is a bye-pass pipe or passage, connected at its lower end to the hydraulic, and also to any desired source of pressure—such as a gas-holder—which pressure may be regulated in any suitable manner. The two parts of the hydraulic can be put in communication with one another, or one part can be connected to the source of pressure by any suitable device—such as two separate valves adapted to be simultaneously operated, or by a three-way valve or other device. In the illustration, there is indicated (diagrammatically) as the means for effecting these connections, a three-way valve G, which may be operated from a distance by a chain H, attached to a pulley I, fixed to the spindle of the valve.

There is attached to part of the hydraulic main a tar-chest J (of considerable depth), divided into two portions by a depending rib extending to within a suitable distance of the bottom, or the further side of the tar-chest is in line with a pipe opening directly into the tar-main K. L is a slide-valve adapted to more or less cover an orifice formed either in the inlet side of the tar-chest (as shown) or else a similar orifice formed in the plate just referred to. The slide-valve is kept to its seat by a spring.

In lieu of using a hydraulic main divided into two portions as illustrated, a gas-tight vessel may be employed of suitable capacity and shape, which would be placed behind the hydraulic main. The lower portions of this vessel and the hydraulic main would be connected by a pipe, and the upper portions of the vessel and hydraulic main would be joined by a valve-controlled bye-pass passage connected to the source of pressure.

Gas Governors.—Ashworth, J. J., Wyke, J. H., and Pilling, G. H., of Bacup. No. 22,293; Oct. 17, 1904.

The object of this invention is to govern the flow of gas through the pipes after leaving the meter by introducing into the pipe union, at a convenient position between the meter and the burners, a valve consisting of a conical casing provided with a lift-valve, working in a suitable seating formed at the top of the conical casing.



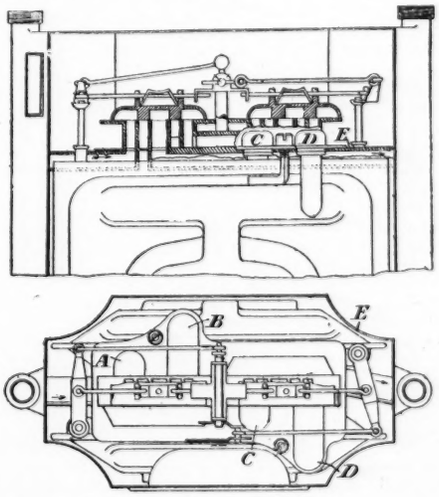
The illustration gives a cross section of a pipe-union or gas-pipe with the lift-valve inserted in position; also a similar view showing the lift or poppet valve, a plan of the conical casing of the valve (the disc or lift-valve being represented by dotted lines), and a plan of the opposite end of the casing.

A is the conical casing formed with a flat top B, which serves as the seating of the lift or poppet valve C, the stem of which slides through a central hole in the top of the valve seating, and is guided by passing through a hole in the cross strip of metal D, which strides the lower part of the casing, thus rendering it more rigid. The valve is simply pressed home, when its conical sides bind against the sides of the gas union. This valve-seating B is perforated with a number of holes which are covered by the fall of the valve C when the gas is turned off; but when the gas is turned on, the valve comes into play, and offers resistance to the passage of gas, "thus diminishing its pressure, and economizing its use."

Gas Meters.—Clark, W.; a communication from the heirs of Emil Haas, deceased. No. 24,478; Nov. 11, 1904.

This invention relates to dry gas-meters of the kind in which, with the object of preventing the oxidation and fouling of the movable parts, the gas is admitted and discharged through the slide-valves alone. Hitherto this has only been possible, the patentee remarks, by employing rotary slide-valves, the use of which "has proved unsatisfactory as regards the actuation and the reciprocal control thereof."

According to the present invention, the object is attained by means of a pair of D slide-valves, each of which is formed with three cavities sliding over five ports in the valve-seat. The slide-valves are mounted



relatively to each other in a manner different to that which has hitherto obtained, on account of the great reach of the vane-wheel rod-levers; while further, on account of the length and weight of the valves, and of the consequent greater leverage, the valves require to be set nearer to the centre of the axle.

Each slide valve-seat comprises five ports; the two seats being respectively covered by three-ported D slide-valves in such manner that no gas can escape from the interior of the meter to the space within the outer casing. The ports of the two slide-valve seats communicate with

one another by bye-passes in the base plate as well as by a connecting passage. The inlet pipe under the cover plate E also connects with the first port. Thus the gas as it enters fills all four ports, and thence passes, according to the position for the time being of each of the D slide-valves, respectively or alternately into other ports of the slide valve-seats which are connected to the four covering ports A, B, C, and D, and thence through the four pipes leading to the measuring vessels, upon which the covering ports bear with suitable jointing faces. The gas then passes into the measuring vessels, where it acts to drive the movable partitions.

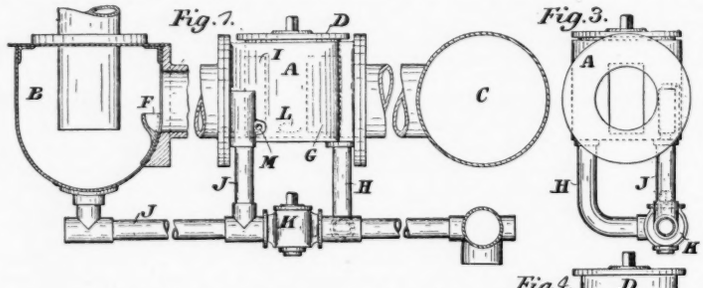
Exactly in the same manner as the entering gas passes respectively or alternately from the chambers through the ports into the measuring vessels, so does the gas which issues from the measuring vessels pass again through other ports into two ports which connect with the exit pipe.

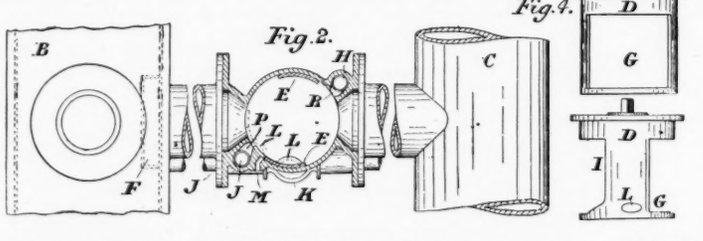
The slide-valve rods which are movably connected on the one hand to the vane-wheel rod-levers are guided on the other hand in a bearing pedestal mounted on the base plate. This pedestal carries (exactly at right angles to the guiding holes) the axle provided with the cranks which transmit the movements of the partition levers by means of a carrier to the counting mechanism. The slide-valve rods do not engage the slide-valves direct, but are each provided with a double carrier adjustably fixed to the slide-valve rods and engage (with some play) behind the slide-valve lugs. This obviates a jerky movement of the D slide-valves, "which is the more necessary that, in view of the great weight and the length of the D slide-valves, the greatest possible care should be taken to ensure their easy motion." Thus the carriers bear against lugs when the slide-valve rods move towards the right hand, and against other lugs when the movement is towards the left. The lugs are apertured to allow of the passage of the slide-valve rods, so that the slide-valves are guided by the rods, and special guiding rods are unnecessary. "By this means also the accuracy and the requisite ease of motion of the valve gear are considerably increased."

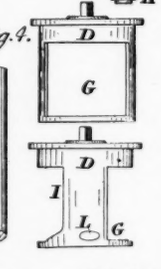
The base plate E (connected to the body of the meter) supports the slide-valve seat as well as the entire valve gear; so that the valve gear can be completely put together beforehand and repairs made with ease. The ports of the slide valve-seat are fitted with jointing faces on the ports leading from the measuring vessels. Consequently, after uncoupling the crank connecting rods and the slide-valve rods from the vane-wheel rods, the base-plate can be removed, together with the entire valve gear.

Valves connected with Hydraulic Mains.—Redman, T., of Bradford. No. 22,110; Oct. 14, 1904.

This invention has for its object to so construct and connect the valves connecting a hydraulic main with the foul-main that gas, tar, and liquor entering the hydraulic may flow through the valve as gene-







rated, and whenever required for the valve to allow gas to pass, but stop the flow of tar and liquor through the valve for a time when more seal to the dip-pipes is required; also to reduce or completely unseal the dip-pipes when desired; to entirely stop the flow of gas, or tar and the like through the valve when desired; and to provide means for the speedy refilling of the hydraulic main with tar or liquid to the depth for resealing the dip-pipes after unsealing or the like.

Fig. 1 is an elevation of a hydraulic main and foul-main in section, with the improved valve secured between; fig. 2 is a plan with the valve in section; fig. 3 is an end view of the valve showing the elongated opening through the branch into the circular cavity of the valve casing; fig. 4 is a view of the circular shell plug removed from the valve casing (showing one of the openings through the wall of the plug), and a view on the opposite side of the circular shell plug provided with an opening having an inclined sill.

The valve casing A is secured to branches of the hydraulic main B and foul-main range of pipes C. The casing is provided with a hollow shell plug D, machined to fit the interior of the casing, and adapted to be rotated in any convenient manner. Through the circular wall of the plug, openings are formed admitting a full-way passage between the mains through the intervening valve; or when the shell plug is turned to the position in which the two webs or shutter covers E are opposite the branches to B and C, the passage for gas is entirely closed. The hydraulic main is provided with a shield F for retaining the tar and the like above the bottom of the branch opening to B and the dip-pipes.

The depth of seal to the pipes is controlled as follows: In the shell plug D is an opening G extending some distance upwards from near the bottom of the plug; and when the plug is in the position shown by fig. 2, the opening communicates with the outlet branch to C, and by a port-hole R with the drain pipe H. An opening I on the opposite side of the plug communicates with the branch to B and a port-hole P in connection with the pipe J. The base of the opening I in the shell plug commences at or about the level of the bottom of the branch opening to B, and inclines upwards, forming a circumferential inclined sill, as shown by fig. 4. On adjusting the rotary position of the plug, so that the inclined sill is opposite the port-hole P, and turning the plug a little to the right or left, the depth of the port-hole is more or less covered; but the openings through the branch to C and the port-hole R remain open. The outlet for tar and the like from the hydraulic main is through the pipe J connecting the bottom of the hydraulic main with the port-hole P and the interior of the shell-plug within the valve casing. The tar and other liquid flowing through the pipe, passes through the port-hole P and over the sill of the inclined opening into the shell-plug, across which it flows, and passes away through the port-hole R to the drain pipe H sealed at the open-ended outlet. This outlet pipe is connected to the pipe J by a flushing tap K, on the opening of which the hydraulic main and the pipe J may be flushed by the released tar and other liquid stored in the hydraulic main. On turning the shell-plug D so that the sill of the inclined opening uncovers the bottom portion of the port-hole P, the tar and other liquid will run off from the hydraulic main through the pipe J to such an extent as to unseal the dip-pipes. The liquid, as before described, on entering the shell-plug, flows across to the port-hole R, through which it passes to the drain pipe H.

When the dip-pipes have been unsealed, the hydraulic main may be refilled with liquid on turning the shell-plug so that the pocket L in the plug is in the position shown by dotted lines in fig. 2. The pocket, acting as a valve, effects an opening between the pipe inlet M and the hydraulic main for liquid to flow from an elevated cistern through the connected inlet for recharging the main to the height of the shield F. The desired depth of seal to the dip-pipes is obtained on turning the shell-plug into position for the inclined sill to uncover to any extent the port hole P, by which any surplus liquid will run over the sill and away to and by the pipe H, as described.

Intermittent Gas Lighting.—Gilbert, E. W., of Peckham, S.E. No. 846; Jan. 16, 1905.

This invention relates primarily to advertising signs (which are alternately illuminated and in darkness), and has reference to gas-signs alternately illuminated and darkened automatically at regular intervals. This is effected by arranging, in close proximity to the illuminating burner or burners, a closed air-vessel, which communicates by a pipe with a space behind a flexible diaphragm (or its equivalent) to which the valve-spindle of the main gas supply is attached. The arrangement is such that the air-vessel becomes heated by the flame of the gas, and by expansion operates the diaphragm to close the valve and cut off the gas supply; but, on cooling, the air operates the valve in the opposite direction, and turns on the gas. A bye-pass flame is employed, so that the gas is ignited as soon as the valve is turned on. By preference, the operating mechanism for the gas-valve is so arranged that its action will be prompt, and thus ensure to the sign sudden illumination and disappearance.

As a modification, the invention may be arranged for lighting a number of burners seriatim, and extinguishing them simultaneously. In this case, the first burner of the series will, by heating the air-vessel adjacent to it, cause a reversely placed valve-operating device to open the gas supply to the second burner. Similarly, the second burner will turn on the third one, and so on until the last burner cuts off the gas from all, as above explained.

Working Turbines Operated by the Combustion of Gases.—Gasmotoren-Fabrik Deutz, of Koln-Deutz, Germany. No. 13,352; June 28, 1905. Date claimed under International Convention, July 2, 1904.

This invention relates to the working of turbines operated by the combustion of gases, whereby a better utilization of the heat resulting from the combustion of the gases is said to be obtained, both as compared with the known method of combustion under uniform pressure, and with that of working the turbine by a series of explosions of combustible charges.

The claim the patentees make for their invention is for a "method of working gas-turbines, which consists in alternately admitting into a combustion chamber with Laval discharge nozzle a compressed intermediate medium, such as steam, and compressed explosive mixture, which is at once ignited; the explosive action causing the steam or intermediate medium to be driven out under a correspondingly high pressure such that the velocity of issue of the cooler but more highly pressed medium is rendered more or less equal to that of the following hotter but less pressed partly expanded combustion gases."

Incandescing Media for Lighting Purposes.—Langhans, R., of Berlin. No. 14,687; July 17, 1905.

This invention relates to improvements on patent No. 12,950 of 1899, according to which the fluid for impregnating the fabric is prepared by dissolving in water crystallizable silicate of sodium, nitrate of zirconium, nitrate of thorium, nitrate of beryllium, and nitrate of cerium, in such relative proportions that in the final structure there are present 1 molecular weight of silica (SiO_2), 1 molecular weight of zinconia (ZrO_2),

from 8 to 128 molecular weights of thoria (ThO_2), from 1 to 2 molecular weights of beryllium oxide (BeO), and so much ceria (CeO_2) as amounts to about 1 per cent. of the thoria present. It is, moreover, known (the patentee remarks) that it is very advantageous to add to the fluid composed as stated a compound of cobalt—preferably cobaltous nitrate—in such proportion that from $\frac{1}{8}$ to 1 molecular weight of the cobaltous oxide (CoO) is present in the final structure; the "addition increasing the lighting power and giving the emitted light a sun-like shade."

As the result of a long series of careful experiments, it is said to have been found that the proportion of thoria can be increased from 144 to 256 molecular weights. This increase of the proportion of thoria is claimed to be of great importance, for the reason that the amount of light-emitting particles or molecules is increased accordingly, and the structure is enabled to more intimately adapt itself to the form of the blue flame. However, to obtain this improvement without doing harm to the strength and elasticity of the structure due to the presence of silica and zirconia, it is necessary to reduce the proportion of cobaltous oxide to $\frac{1}{8}$ to $\frac{1}{4}$ molecular weight; whereas the proportion of ceria must be such that, for each 64 molecular weights of thoria, there is present 1 molecular weight of ceria—the proportion of beryllium oxide being best limited to, or to only slightly more than, 1 molecular weight.

As a guide for composing the impregnating fluid, it will suffice to refer to the limits of thoria stated below:—

	Molecular Weight.	Proportion or Molecular Weights.	Preferred Form of Salt.
		I.	
Thoria (ThO_2)	264	144	Basic nitrate
Ceria (CeO_2)	173·2	2·25	Nitrate
Zirconia (ZrO_2)	122·32	1	Basic nitrate
Silica (SiO_2)	60·22	1	Crystallizable sodium silicate
Beryllium oxide (BeO)	24·99	1	Nitrate
Cobaltous oxide (CoO)	75	0·125	Neutral nitrate
		II.	
Thoria (ThO_2)	264	256	Basic nitrate
Ceria (CeO_2)	173·2	4	Nitrate
Zirconia (ZrO_2)	122·32	1	Basic nitrate
Silica (SiO_2)	60·22	1	Crystallizable sodium silicate
Beryllium oxide (BeO)	24·99	1·14	Nitrate
Cobaltous oxide (CoO)	75	0·25	Neutral nitrate

Moreover, the inventor says, it has been found that it is of great advantage to add some sulphuric acid to the aqueous solution of the compounds constituting the fluid. This addition has the effect of modifying the porous or spongy condition of the structure obtained by burning and calcining the impregnated fabric; and it has been found to afford a reliable means for controlling or regulating the porous or spongy condition of the incandescent structure so that it can be varied, according as it is desired to produce a softer or a denser structure. The greater the proportion of sulphuric acid added, the more porous or softer the structure will become, and *vice versâ*. With a proportion of 144 molecular weights of thoria, from 8 to 28 molecular weights of sulphuric acid may be used; whereas with a proportion of 256 molecular weights of thoria, it is preferred to use from 14 to 42 molecular weights of sulphuric acid.

The impregnating fluid is prepared in the manner described in the 1899 patent, and finally the sulphuric acid is added; the gelatinous precipitate caused by this addition being readily re-dissolved. The sulphuric acid may be added in the concentrated or diluted state.

APPLICATIONS FOR LETTERS PATENT.

17,871.—Lake, W. E., "Bodies for incandescent gas lighting." A communication from Gasglulicht Ges. Hamburg, m. b. H. Sept. 4.
17,911.—Tee, H., "Incandescent gas lamps and burners." Sept. 5.
17,925,—Cox, G. J., "Gas-cooking apparatus." Sept. 5.
17,967.—Gardam, H. H., "Gas-producers." Sept. 5.
17,989.—Helps, G., "Incandescent burners." Sept. 6.
18,004.—Kennedy, R., "Making producer gas." Sept. 6.
18,005.—Nicholls, G. G., "Mantle support." Sept. 6.
18,012.—Fairweather, W. C., "Obtaining a high-pressure light with inverted burners." A communication from R. O. Klatte. Sept. 6.
18,018.—Fairweather, W. C., "High-pressure inverted incandescent gas-burner." A communication from R. O. Klatte. Sept. 6.
18,029.—Allen, E., and Co., Limited, and James, C. W., "Measuring and delivering coal." Sept. 6.
18,107.—Hemmings, J. F., "Anti-vibrators." Sept. 7.
18,149.—Spencer, E., "Gas-pendants." Sept. 8.
18,161.—Bell, A., "Gas-stoves." Sept. 8.
18,174.—Ziegler, M., "Gasification of peat." Sept. 8.
18,197.—Clark, W. E., "Incandescent burners." Sept. 8.
18,199.—Stone, F. W., "Carburettors for lighting, heating, and other purposes." Sept. 8.
18,200.—Watkinson, J. G., "Inverted burners." Sept. 8.
18,205.—Schwab, M. C., "Conveyors." Sept. 8.
18,218.—Waddell, A. & F., "Utilizing heat by bringing it into contact with cooling materials within a closed vessel." Sept. 9.
18,237.—Sutcliffe, H., "Street lamps." Sept. 9.
18,267.—Schwarzhaupt, A., "Gas-igniters." Sept. 9.
18,280.—Martini, C., and Hüneke, H., "Conduits for combustible liquids." Sept. 9.
18,281.—Jottrand, F., "Mixing a combustible gas and a gas adapted to support combustion." Sept. 9.

Re-instating Trenches at Battersea.—The Highways Committee of the Battersea Borough Council reported on Wednesday that no objection had been taken by the gas and water authorities, and other companies interested, to the revised scale of charges adopted in January last for re-instating trenches. The Postmaster-General had, however, written asking that the scale might be reconsidered. It was resolved to adhere to the charges that had already been approved by the Council.

MISCELLANEOUS NEWS.

GAS v. ELECTRICITY FOR STREET LIGHTING.

The Proposed Croydon Experiment in Electric Lighting.

Several allusions have been made in the pages of the "Journal" to a report recently presented to the Corporation of Croydon by the Lighting and Electricity Committee; but no extracts from the report have been given, as it at one time appeared as though there would be no particular outcome from the Committee's recommendation to carry out a considerable experiment in electric lighting in the streets of the borough. Now, however, that (as will be seen later on) the two Gas Companies interested in the lighting of Croydon have formally protested against the extravagance of any such scheme as that proposed, it may be well to preface the letter that has been addressed by them to the Corporation, by giving an abstract of the original document.

The Croydon Electric Committee's Report.

A large number of inquiries have been sent out by the Committee; and the inquiries and answers have been tabulated. With the exception of one district in London, where high-pressure gas is being used, no town appears to be reverting to gas; and, in this case, gas has not superseded electric lighting by arc lamps. On the other hand, the Committee find that lighting by electricity is considerably on the increase, and several towns have now no gas lighting in the streets. In reference to Paris, the Committee find that electric lighting is not making satisfactory progress. It has been found that the prices charged are very high; and as the concession for electric lighting expires in two or three years—when the Electricity Companies have to hand over their entire property to the Municipality without payment—it can hardly be expected that much progress will be made until a new order of things is established. With reference to the City of London, the Committee have made careful inquiry on the reported reversion to gas by the City, and find that the City Council have decided to light the following streets by gas—viz., Queen Victoria Street, part of Queen Street, and Fleet Street. The Chairman of the Committee stated ("Journal of Gas Lighting," May 9) that these three schemes were in the nature of an experiment, and nothing further would be done until they were thoroughly tested. The Committee cannot discover that there has been any attempt to compare the proposed gas lighting with the more modern systems of electric lighting. The comparison was made ("Journal of Gas Lighting," May 9) between the suggested gas lighting and the existing arc lamps. The Committee consider this the most unreasonable basis on which to make a comparison. It is well known that the existing arc lamps were some of the earliest erected in the country, and the lanterns about as unsuitable as could have been chosen. There are now two Electric Supply Companies competing in the City of London; and the relations between the original Company and the Corporation have not been altogether of a harmonious nature. The Committee, as a result of inquiries, believe that they are correct in stating that neither Electric Supply Company was asked to submit a formal tender for comparison as to the cost of street lighting; and, under the circumstances, and apart from the fact that the present installation is an experimental one, they do not consider that any importance whatever can be attached to the action of the City Corporation. Taking the estimated cost of the alteration at £2042, and the saving anticipated at £323, it will take 6¼ years to repay the initial cost. The Committee suggest that the price of £26 per arc lamp would have been considerably reduced on a new tender, and the amount of light increased several-fold.

Summary of Particulars relating to Street Lighting at Croydon in 1904.

Type of Lamp.	No. of Lamps.	Distance apart (Yards).	Total Cost.	Average Candle Power per Mile.	Cost per Candle Power per Annum.	Average Candle Power.
Incandescent gas	2137	80	£7062	839	15·862d.	50
Nernst and incandescent electric	90	66	288	1,373	13·71d.	56
Electric arcs	428	65	7212	10,537	11·328d.	357

The Croydon Gas Company charge 2s. 8d. per 1000 cubic feet and the Crystal Palace Company 2s. 5d. The latter Company are now increasing their price to 2s. 6d. In the third column of the above table, "Distance apart," the figures are misleading. All the electric lamps have been added during the last few years, in which time the distance apart of the lamps has been reduced. The average distance apart given in the table for gas-lamps is arrived at by taking the number of miles of streets in the borough, after deducting streets lit by electric lamps, and dividing by the number of gas-lamps. This includes several roads not yet lit or only partly lit, and also many outlying roads in which the distance between the lamps is excessive. Again, the above summary is not a correct comparison, as by placing the arc lamps at cross-roads 150 gas-lamps are saved, or a sum of £513 per annum, which should be subtracted from the cost of arc lighting.

The results of the Committee's investigations show that very exaggerated claims appear to be made by various interested parties as to the particular type of lamp which they favour, and they feel, therefore, that considerable discretion is necessary in forming an opinion as to the relative costs of the various systems of lighting. The correct basis on which to compare the relative costs of different types of lamps is the average total cost per candle-power per annum.

With regard to the Croydon tests every effort has been made to procure an accurate result; and the Committee believe that the same (as set out in the table, p. 758) can be taken as such on the working conditions, and there is no doubt that the results for comparative purposes are quite reliable. The electric Nernst lamps for side-street lighting in

Tests on Street Lamps (Gas and Electric), with Statement of Comparative Costs.

Description and Position of Lamp.	No. of Lamps in Use of Class Specified.	Average Candle-Power.	Total Cost per Lamp per Annum.	Total Cost per Candle-Power per Hour.	Average Total Cost per Candle-Power per Annum, Including Tests up to Date.	Remarks.
Electric arcs. D.C. 520 watts. Alabaster globes, centre of town . . .	63	494	£18 0 0	0·00232d.	8·70d.	..
,, A.C. 650 ,, Half opal globes, at intervals, London Road	80	438	18 0 0	0·00239	8·96	..
,, A.C. 450 ,, Half opal globes, London Road, &c. . .	218	295	18 0 0	0·00389	14·59	..
,, A.C. 500 ,, Half opal globes, Brighton Road . . .	65	270	18 0 0	0·00425	15·94	..
,, D.C. 690 ,, Alabaster globes, at Greyhound and Arcade	2	500	18 0 0	0·00232	8·70	..
Nernst lamps, ½ ampere. Type A, St. James's Road, Torridge Road, &c..	53	56	3 8 6	0·00391	14·66	..
Incandescent gas-lamps	..	..	2 18 4	0·00332	12·45	..
*Croydon Gas Company	1,632	52	3 8 6	0·00421	15·79	Croydon area
South Suburban Company	505	44	2 18 4	0·00422	15·82	Crystal Palace area
Electrical Company's A.C. flame arc 550 watt. Opalescent globe, Brighton Road	1	1400	18 0 0	0·00082	3·075	..
Santoni lamp, Katharine Street, 430 watt	1	1175	18 0 0	0·000978	3·668	..
Incandescent lamp with "Reason" fittings	2	57	3 8 6	0·00384	12·403	Croydon area
	..	..	2 18 4	0·00326	12·228	Crystal Palace area

* The lamps in the South Suburban Company's area were all newly cleaned and fresh mantles were put on. The tests are, therefore, much better than if they had been taken after a few days' use of the mantles.

the South Suburban Company's area are charged at the same rate as the gas-lamps in that area, and in the area of the Croydon Gas Company at the rate charged by that Company. With reference to the former Company's area, these prices will be increased, owing to the fact that notice of an increase in the price of gas has been given by them. The present lighting is mainly divisible into four sections: (1) Direct-current electric arcs. (2) Alternating-current electric arcs. (3) Nernst lighting. (4) Incandescent gas lighting.

With reference to (1) direct-current electric arcs, it will be noticed that this works out at an average total cost per candle-power of 8·7d., which is only half the cost of similar lighting by means of Nernst lamps or incandescent gas. It will be seen that the present system of electric lighting by means of direct-current arc lamps in the centre of the town, is far more economical than by means of gas lighting. The Committee feel, therefore, that the lighting by means of these lamps (as carried out in the centre of the town) has proved a satisfactory method to the Corporation. (2) It will be noticed in the table of tests that there are three kinds of alternating-current arc lamps at present in use—Nos. 2, 3, and 4. With reference to 650 watt lamps (No. 2 in table) it will be noticed that these lamps are almost as satisfactory as the direct-current lamps and the tests came out much cheaper than the gas or Nernst lighting. (3) With reference to the 450-watt lamps (No. 3 in table), these work out at approximately the same cost as the Nernst lighting and are slightly cheaper than gas. Although in the case of No. 2 (650-watt lamps), the lamps are satisfactory on the question of cost, and the 450-watt lamps came out cheaper than gas, still from a lighting point of view, they are not so efficient as the direct-current arcs, and the colour of the light is not so satisfactory. However, new alternating-current lamps are being introduced, from which the amount of light obtained from a given amount of electrical energy is enormously increased. There is a further objection which must be borne in mind in considering any suggestion of using incandescent gas-lamps in the main thoroughfares, even supposing the cost would warrant it, and that is, with the present number of tramway poles in the streets, the addition of a large number of extra poles in these streets would be a serious matter.

The Committee are of opinion that the Corporation will not be disposed to reduce the amount of illumination, more especially in the main roads, but, on the other hand, would prefer that the amount should be increased. The Committee feel that, in aiming at the best lighting of the streets, it is far better that the lamps should be suspended fairly high up, so that the light will be properly diffused, and that it should be out of the line of vision of pedestrians and persons in charge of vehicular traffic; the reason being that a light which is not high up, will obscure the view of persons, and with the large volume of traffic in the streets (which in this borough is increasing very rapidly) the likelihood of accidents would be considerably increased. This statement can be easily proved by anyone who watches the traffic passing along the streets lighted by high candle-power lamps suspended at a height of, say, 25 feet, and along one lighted by lamps where they are of the ordinary height. There is the further advantage of the light rays from the higher-placed lamp being in a more vertical direction.

It will be noticed that the Nernst lighting comes out slightly more advantageous than gas lighting; and therefore there is every justification for the Council lighting the side-streets by means of their own supply in the streets where the mains are laid. It will be seen from the table that although the charges made by the South Suburban Gas Company are less than those of the Croydon Company, still the light obtained is not so good, and therefore there is not very much actual difference.

The Committee have gone into the question of what improved forms of lighting there are now on the market. The improvement in gas lighting for outdoor open spaces has been effected by the adoption of high-pressure lamps. These lamps, of course, take a very much larger amount of gas than the ordinary lamp. The number of mantles used is also considerably more, if a reasonable efficiency is to be obtained. The cost of the mantles is more, and the amount of attention is greater. All these points necessitate a much higher price being charged for such a lamp. There is a further serious disadvantage in connection with the use of these lamps; it being necessary to have a gas-engine or other form of pumping machinery to do the necessary pumping for them. This also requires attention; and, in addition, there is the cost of upkeep of the plant. Several kinds of this type of lamp are at the present time being tried in London. The Committee would emphasize the point previously mentioned, that the gas-lamps were fixed rather low, and although the amount of light thereby obtained appears to be greater, the Committee consider that it is advisable that lamps of larger candle-power should not be fixed low.

Making due allowance for the above facts, the Committee find that gas lighting has considerably improved by means of high-pressure lamps; but although these advances have been made, so long as the price of electric arc lamps does not exceed a certain amount, the cost of lighting by means of the ordinary direct-current arc lamps should be more economical than by the high-pressure gas-lamps.

The Committee also find that considerable improvements have been made with electric arc lighting. This has been primarily brought about by the introduction of a new type of arc lamp known as the "Flame Arc Lamp." They have had some of these erected for their inspection and tests made on the same; the results obtained being very satisfactory. On the table showing the results of the Croydon tests No. 8, reference is made to one of these lamps fixed on the alternating supply. If the candle-power of this new type of lamp is compared with that obtained from the direct-current lamp, which is the most efficient at present in use, it will be seen that in the case of the former approximately treble the light is obtained for the same cost of electrical energy. If one of the gas-lamps being installed in the City, and described by their makers as 600-candle power, is compared with the sample of the new Flame lamp which has been hung in the Brighton Road for the Committee's inspection, the candle-power of which on test is actually 1400, it will be found that, with the light from the arc lamp being two-and-one-third times as much as the light from the gas-lamp and the price of the electric arc lamp approximately half as much again as the gas-lamp, the price of the former works out at less than half the price of the latter on the basis of light value. The price proposed to be charged for the gas-lamp installed in the City is, we understand, £12 10s., and the price charged per arc lamp used in Croydon is £18. The Committee would also like to point out, for the further information of the Council, that the rays given off by this type of lamp are very satisfactory in the penetration of fogs; they being of a reddy-yellow tendency. On the other hand, the high-pressure gas-lamp's rays are somewhat similar to those of the ordinary arc lamps, which are not so satisfactory for lighting purposes during a fog.

The Committee are of opinion that the result of their investigations has been to show that, taking all things into consideration, the system of lighting which has been adopted is most satisfactory, and they wish further to point out that even if the balance in its favour had been very small indeed, it would yet be in the interests of the Corporation to keep the lighting of the borough as far as possible in its own hands, and so retain any advantage which may accrue through a larger output of the Corporation electricity works. This should carry due weight with any decision that may be arrived at in connection with the matter, as an advantage to a Corporation Department means, of necessity, an advantage to the whole of the ratepayers. The amount spent on street lighting by the Electricity Department amounts to £13,552; and the annual charge on the amount for interest and sinking fund amounts to £813. The Committee have, from time to time, given reductions to all classes of consumers; and they now recommend that arc lighting be reduced by £1 per lamp per annum as from Sept. 29.

The Gas Companies' Reply.

Under date of the 15th inst., Mr. Charles M. Ohren and Mr. William W. Topley, the Secretaries respectively of the South Suburban and Croydon Gas Companies, have addressed the following communication to the Mayor, Aldermen, and Councillors of the Corporation of Croydon, traversing some of the chief statements made in the above report.

Gentlemen,—The Directors of the Croydon and South Suburban Gas Companies have had their attention drawn to a report on street lighting, dated July 13 last, by your Electrical Committee.

We are instructed to appeal to your sense of justice to allow us to put the case from another point of view, believing that your desire must be to have the streets lighted in the best manner at the lowest cost. We desire to prove by this reply to your Committee's report, and by practical experiments to be carried out with your permission in suitable positions in the borough, by each Company at its own cost, that incandescent gas lighting is the most efficient and much the cheapest street illuminant. Our Directors desire to point out that, to obtain a fair view of the matter, the Council should treat the report as a statement of an Electrical Department anxious to maintain and extend its business, and should accordingly reserve judgment till the following facts have been considered. It may also be remarked, with reference to the note after Table 2 at the end of the report, that it is the practice of the Companies to maintain the mantles in good order from day to day—fresh ones being fixed as required. The conditions in which they were seen was, therefore, their normal state.

The report states that "lighting by electricity is considerably on the increase, and several towns have now no gas-lighting in the streets." As the towns are not named, nor the particulars given, that statement can only be dealt with generally; but it may be assumed that these are places where the electricity supply is owned by the respective towns and the gas supply is by companies. It by no means follows that to light the streets in the most efficient manner, and at the lowest cost, has been the paramount consideration in these cases. It is most probable that electric lighting has been adopted or extended, on considerations such as those set forth in your Committee's report, in order to obtain an increase of business for the Electrical Department.

If in the towns referred to, electricity and gas were both supplied by companies, and the former had been adopted in fair competition, the statement of your Committee would have been difficult to answer; but it so happens that in both the important cases mentioned—viz., Paris and London—where both lights are supplied by companies, electric street lighting, as admitted in the report, is losing ground. Your Committee tried to explain that "electric lighting is not making satisfactory progress" in Paris by stating that "the prices charged are very high" (no doubt because the price of electricity is high enough to pay expenses); but they omit to state the fact that the price of gas in Paris is also much higher than in Croydon.

The report refers to the "reversion to gas by the City of London," and says that "the Chairman of the Committee stated ('JOURNAL OF GAS LIGHTING,' May 9) that these three schemes were in the nature of an experiment." This was said in reply to one or two objectors. If your Committee had quoted from the Chairman's opening speech, a very different view of the matter would have been given. In that speech, the following statement occurs: "He did not wish to say a word against electric lighting; but he was convinced that it was a complete failure as a street illuminant." To be quite fair in this matter, the full report of the meeting of the Court of Common Council on Thursday, the 4th of May, and the City Engineer's report, as published in the "JOURNAL" of May 9, accompany this reply.

We desire, however, to point out that this action of the City is really the result of very extensive experiments extending over a number of years. These experiments began in 1901, with an offer by the South Metropolitan Gas Company to change the ordinary gaslights to high-pressure incandescent gas on Southwark Bridge, at their expense, with a proviso that the Company should remove them if not approved, but should the City determine to keep them they should reimburse the Company. They were so satisfactory that the City not only paid for them, but ordered all their other bridges to be lighted the same way; and so they continue to this day. At the foot of Blackfriars Bridge, on the City side, some incandescent high-pressure gas-lamps were fitted in close proximity to the electric arc lamps. It was this experiment that convinced the City of the superiority of gas. And not only of high-pressure gas; for the City Engineer's report states that in 1904 "the incandescent gas system was extended by the fixing of 907 additional lamps," and "the high pressure system of lighting was continued and extended during the year."

The London County Council, at their meeting on the 1st of August last, resolved to replace their own electric lights on Waterloo Bridge with incandescent gas, at a cost of £650—a large sum, which the London County Council would surely not spend unless gas were both better and cheaper. It should be added that they have also decided to light Aldwych with gas.

The whole of the lighting of the magnificent new Victoria Station of the Brighton Railway Company has been competed for by the respective Electricity and Gas Companies, and has been given to gas. This decision was arrived at after extensive trials with gas lighting at the existing station, which resulted in a very large saving when compared with the cost of lighting by electricity.

At Liverpool, where the Corporation own the electric supply, gas has been found superior; and the whole city is lighted with incandescent gas supplied by the Gas Company. The case of Liverpool by no means stands alone. Among others, the Bradford Corporation own both the gas and electricity undertakings, but prefer gas for street lighting.

To return to the report, certain tables are given, in which are set out various particulars of the number, distance, candle power, and the cost of flat-flame and incandescent gas-lamps and arc and Nernst incandescent electric lamps. As to the Nernst electric lights, the report says these "are charged at the same rate as the gas-lamps." But it does not say that this is a paying rate; there being little doubt that there is a considerable loss. Moreover, these lamps are only 72 yards apart, against 105 yards for the gas-lamps. Then it is said "that the Nernst lighting comes out slightly more advantageous than gas;" and the Council are advised to light "the side-streets by means of their own supply" in this way, which is certainly less efficient and more costly than gas, if a paying price is charged.

The first table gives the position in 1894 when batswing flat-flame burners of about 15-candle power were exclusively used, and the lamps averaged the extreme distance of 118 yards apart; the cost averaging £50 8s. per mile.

There appears to be a serious and misleading error in the table relating to 1904, which greatly understates the distance apart of the gas, slightly understates that of the Nernst lamps, and overstates that of the electric, as follows:—

	Average Distances apart. As per Table.		Corrected.
Gas lamps	80 yards	..	105 yards
Nernst ,,	66 ,,	..	72 ,,
Electric ,,	65 ,,	..	60 ,,

The gas-lamps are 76 per cent. farther apart than the electric arc lamps—that is, there are 7 electric against 4 gas in an equal length of street. Probably one reason for this is to be found in the necessity of placing the arc lamps in so lofty a position, and in the fact that at greater distances the lights would cause very unpleasant alternations of light and shadow. It is a strong testimony in favour of gas that, with lamps so far apart as 105 yards on the average, the borough is as well lighted as it is at present.

In both tables there is a serious omission; in fact, the information given in the seven columns is scarcely intelligible, and is of very little value without the addition of a column giving the cost of lighting per mile of street. This, according to the figures of the second table, average as follows:—

Incandescent gas in 1904	£55 8s.	per mile.
Nernst electric	78 10	,,
Electric arc	497 5	,,

Moreover, these figures are unfair to gas, inasmuch as they are calculated on the assumption that the hours of lighting are the same for gas as for electricity; the fact being, however, that while each gas-lamp is alight throughout the hours of darkness—that is, some 3980 hours out of the 8760 in each year—the electric lamps are extinguished at varying hours, many of them at 11 o'clock or midnight.

The cost of lighting has been more than doubled over the entire borough by the adoption of the electric light in about 18 miles of streets out of a total of 145 miles—that is, gas costs less by £438 for 127 miles than electricity for 18 miles.

127 miles of gas cost in 1904			£7062
3½ ,,	Nernst electric	£288	
14½ ,,	arc electric	7212	
			7500
Difference			£438

The cost of electric lighting is given as £7500 for the year 1904; but in one paragraph the capital cost of the installation is given as £13,582, and it is stated that "the annual charge for interest and sinking fund amounts to £813," which is not included in the £7500. That figure should, therefore, be increased to £8313. This makes the cost of lighting 18 miles of streets electrically exceed by £1251 per annum the cost of lighting 127 miles by gas.

The report says: "The correct basis on which to compare the relative cost of different types of lamps is *the average total cost per candle power per annum.*" The Committee cannot be aware of the difficulty and uncertainty of making photometric tests in the streets, and of the small practical value they have when made, or they would not have penned that sentence. Mr. Morton, the Chairman of the City Streets Committee, gave a much better and a really intelligible basis in his speech at the meeting on the 4th of May (see accompanying report). He said: "In his opinion, the best test of good lighting was a man's own test—that was to say, for a person to himself ascertain which illuminant was best to see by." This was practically endorsed by Mr. Williams and by Mr. Cooper in following speeches.

According to table 2, the average candle power is given, for what it is worth, at 839 candles per mile of street for gas, and 10,537 for electric arcs. Either the one is woefully deficient or the other is scandalously extravagant. What is the use of a comparison of costs based on candle power per annum (when according to the figures given) to effectively light the streets by one kind of lamp, 10,000 candles must be provided per mile, against 800 with the other. Things that differ to such an extent cannot be compared by saying that the extravagant one costs only 11·328d., while the enormously cheaper one costs 15·862d. per candle power per annum. Note the exactitude of these figures—to three places of decimals of a penny. In fact, the cheaper article in this case is much the dearer; for no man in his senses would think of buying 10,000 articles at 11d. each, when 800 of another kind at 15d. would answer his purpose.

"The proof of the pudding is in the eating;" and the proof of the lighting is in the seeing. Will the Corporation set apart a certain representative length of street or streets in the districts of the respective Companies, and allow them to light them with incandescent gas, high-pressure or otherwise, or both, as the Corporation may decide, with or without a limit of price per mile of street, and in a manner which, if adopted by the Council, would represent to the ratepayers an annual saving equal to at least a rate of 1d. in the pound, and which it is contended would compare favourably with present electric arc lighting? If so, the Companies will be glad at their own expense to supply and fix columns, lanterns, and burners, to effectively light the places selected, and remove the same after a trial of not less than six months, if not approved; but if the Corporation wish the lighting continued, they shall pay to the Companies the cost price of the installation—these being the conditions offered to the City Corporation in connection with Southwark Bridge.

In the report it is stated that, "in aiming at the best lighting of the streets, it is far better that the lamps should be suspended fairly high up, so that the light will be properly diffused, and that it should be out of the line of vision of pedestrians." This presumably refers exclusively to electric arc lighting, as only these lights are "suspended." The principle enunciated is contrary to all experience and practice in gas lighting. Gas lights of moderate illuminating power, 10 or 12 feet from the ground and fairly near together, give a result in uniform illumination which is most necessary for the efficient lighting of the streets and which is utterly unattainable by electric arc lamps.

The report recommends an extension of the arc lighting, in order to increase the output of the electricity works, though nothing definite is said about the profit of so doing. But making the improbable supposition that some small profit may be made, it cannot be right to call upon the ratepayers to pay another £7000 a year for electric lighting, less the fraction saved by abolishing gas, in order to increase the output of the electricity works at little or no profit, or possibly at a loss.

If the Corporation contemplate spending £500 a mile per annum for public lighting by electricity when it can be more efficiently done with gas at less than half the cost, the Gas Companies make the request that the decision be delayed until after the proposed experiment has been made.

(Signed) CHARLES M. OHREN,
Secretary, South Suburban Gas Company.

WILLIAM W. TOPLEY,
Secretary, Croydon Gas Company.

Sept. 15, 1905.

SHEFFIELD UNITED GASLIGHT COMPANY.

The One-Hundred-and-First Ordinary General Meeting of this Company was held last Tuesday. Sir FREDERICK MAPPIN, Bart., M.P., presided; and, in view of his absence from the previous meeting, owing to ill-health, the shareholders present gave him a most cordial reception on his rising to address them.

A SATISFACTORY REPORT.

The CHAIRMAN, in moving the adoption of the report and accounts (see "JOURNAL" for Aug. 22, p. 508), said he thought the report was in every way satisfactory. The Directors, he considered, acted wisely in reducing the price of gas on the 1st of April to 1s. 6d., 1s. 4d., and 1s. 2d. per 1000 cubic feet, according to consumption, and to 1s. 2d. for gas-engines. After paying 10 per cent. dividend (which absorbed £43,424) they had £3194 to add to the undivided balance, which would now stand at £73,246, and which would be carried forward to the next half year. The shareholders should bear in mind, too, that the reserve fund was full, at £86,848. He had every confidence in saying that gas consumers in Sheffield were placed on as good terms as in any town or city in England. The quality of the gas had been maintained; 1166 tests made by the Corporation officials and their own officers showing an average of 17·37 candles. In making a profit of £46,619, coals had cost them less by £6359; purifying materials had cost £450 less; wages, £785 less; and repairs of mains and services, £2346 less. On the other side of the account £4084 less had been received for gas, £2048 less for coke, £2061 less for tar, and the repairs of works had cost £1803 more.

CONSUMPTION STATISTICS.

The gas sold had been 1,337,047,000 cubic feet, as against 1,336,439,000 cubic feet in 1904. The gas made per ton of coal carbonized was 10,506 cubic feet, as against 10,422 cubic feet in 1904. The gas sold for engines in the twelve months had been 228 million cubic feet—an increase of 3 millions over the previous twelve months. They had every indication that the consumption of gas by engines would go on; for they had during the last six months fixed 39 additional gas-engines, as compared with 24 in the same period of 1904. Not only had more been fixed, but the size had greatly increased. The new engines varied from 220-horse power to ½-horse power, while in the previous year they had ranged from 130 horse power to ½-horse power. There had been 344 gas-fires and 868 boiling and other stoves sold; and 351 additional cooking stoves had been let on hire. He thought all this indicated that the Company would in the future be as prosperous as ever.

NAPHTHALENE TROUBLES.

The naphthalene complaints, he was glad to say, were hopeful. For many years they had been giving the Company great trouble and anxiety. During the present year, up to Aug. 15, they had had only 415 complaints about this nuisance; and in the year before, during the same period, they had 4041 complaints. Thus the decrease had been a most substantial one.

THE COMPANY'S STORAGE.

They were aware that the Company were erecting a new gasholder at Neepsend—a very large one, with a capacity of 7,706,000 cubic feet. The cost of the holder and tank was £51,015. They would have been glad of this holder some years back; but considering the high prices of materials, and the then state of trade, they decided to let it rest for a time, and they had only this year erected it. The result has been a very large saving of capital expenditure. In about two or three weeks, he hoped it would be at work. They had had no difficulty with it. The ground was very suitable for the tank; and the contractors were very efficient people. Their present storage capacity was 13,800,000 cubic feet; and with the new holder it would be 21,500,000 cubic feet—sufficient to carry them on for some years. He had before him a list of days when they had had large consumptions. In 1895 the highest was 11,500,000 cubic feet; in 1896 it was 14,000,000; in 1897 it was 15,250,000; in 1901 16,250,000; and in 1904 18,250,000. They sometimes had, however, three or four dark days together; and it was these times they had to prepare for, and they had experienced much anxiety with this kind of weather. When all their retorts were at work they could produce 19 million cubic feet, which would place them in a very good position; and unless something unforeseen arose, he hoped the Company might be able to maintain the low price at which they supplied gas, and carry on for a good many years with their present appliances.

THE PRICE OF GAS IN SHEFFIELD.

Proceeding to speak of matters of interest which had occurred during the period under review in different towns, the Chairman said that at a meeting of the Glasgow Corporation Gas Committee on Aug. 10, Mr. Willoch seconded the adoption of the report, which proposed to reduce the price of gas for manufacturing purposes from 2s. to 1s. 9d. per 1000 cubic feet. Three years before the price was 2s. 4d., and was then reduced to 2s. He stated that the Birmingham price for lighting and heating was 2s. 3d., and for motive power 1s. 10d., less 5 per cent. The Commercial Gas Company (London) charged 2s. 6d. and 2s. for motive power. Darlington charged 2s. to 2s. 6d.; and for motive power, 1s. 8d. In Nottingham, the price was 2s. 2d. to 2s. 8d., and for motive power 1s. 6d. In the course of his remarks, Mr. Willoch stated that the price in Sheffield was 1s. 10d. per 1000 cubic feet for lighting, and 1s. 2d. for power. This was a mistake, and he hoped Mr. Willoch would correct it. They were charging 1s. 6d., 1s. 4d., and 1s. 2d., according to consumption, and for motive power 1s. 2d., as he had said.

THE ABANDONMENT OF ELECTRICITY FOR PUBLIC LIGHTING.

They had heard a good deal in reference to the giving up of electricity for street-lighting purposes. London, the richest city in the world, had stopped adding to the installation of electricity in its streets, and was replacing many electric lamps by incandescent gas-lamps. If London could do this, there must be a cause for it. The gas system progressed year by year. The London County Council recently cut off their electricity from Waterloo Bridge and adopted incandescent gas. He thought that the Council were in this way going in the right direction. The London, Brighton, and South Coast Railway had given up electricity at Victoria; both the old and new stations being lighted by incandescent gas. At the Preston Town Council meeting on Aug. 31, Alderman Pearson moved a recommendation to give up 45 electric arc lamps, said to be 1000 candle power, which cost £825 per year, and proposed that they should replace them with 95 double incandescent gas lamps—45 Podmore and 50 Bellamy pattern lamps. Two of the Podmore lamps had been fixed for two years in different parts of Preston, and had given every satisfaction, each being equal to 400 candle power. The Preston Corporation had had Bellamy incandescent lamps in use for some time; and these had also given the Lighting Committee satisfaction. The capital cost of 95 new lamps (including lanterns, fitting, burners, and fixing) would be £614 6s.; and the total cost of gas for them would be £392 10s.—a saving over electricity of £433 per year. After some discussion, it was agreed that the question should be referred to a joint meeting of two Sub-Committees, with instructions to deal with the matter at once. Surely, if they could effect a saving and have the streets better lighted, they would be right to adopt the gas system. Marylebone had increased its incandescent gas lighting by upwards of 5000 lamps, notwithstanding their purchase of an electricity undertaking, which had involved an expenditure of nearly two millions sterling. At the South Suburban Gas Company's meeting, Sir George Livesey had given a list of a number of consumers using incandescent burners; and their accounts averaged 37 per cent. less by adopting this system than when using the old flat-flame burners. This should be some inducement to people to give up the old-fashioned method of lighting their houses. In conclusion, Sir Frederick (saying he thought that the shareholders could have every confidence in the undertaking in which they had invested their money) moved that the report be adopted.

Mr. H. K. STEPHENSON seconded the resolution.

There were no comments by any of the shareholders, and the motion was unanimously carried. The motion declaring the dividend was also carried, and the retiring Directors re-elected.

The CHAIRMAN, responding to a vote of thanks to himself, the other Directors, and the staff, said he was glad the vote included the officers of the Company, for as a Company they were as successful as any in the kingdom. It was more than 32 years since he was elected as Chairman of the Company; and he had now to consider his health, and had begun to think that it was time he gave place to a younger man, and that they would succeed as well under a young man's care as under that of an old man. He thanked the shareholders for the vote they had passed.

OTTOMAN GAS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Tuesday, at the London Offices, No. 9, Queen Street Place, E.C.—Colonel JAMES LE GEYT DANIELL in the chair.

The SECRETARY (Mr. T. Guyatt) read the notice convening the meeting, and the certificate of the Auditors. The report (which was taken as read) stated that the gas-rental for the half year to June 30 amounted to £11,875, as against £11,270 in the corresponding six months; while the net profit was £2836, as compared with £2750. The amount standing at the credit of the profit and loss account was £5799, out of which the Directors recommended the payment of a dividend at the rate of 7 per cent. per annum on both classes of shares, absorbing £2625, and leaving a balance of £3174 to be carried forward.

The CHAIRMAN, in moving the adoption of the report, said that when he had the pleasure of addressing them twelve months ago, they might remember that he referred to the steady increase in the prosperity of Smyrna, and to its growing importance; and when explaining that the reduction in the gas-rental that half year as compared with the same period the previous year was in consequence of the reduction in the price of gas, he was bold enough to state that by this time they would see a material improvement. Though the same cause had affected the rental in the December half of 1904, his forecast, judging by the accounts now before them and by the reports received from their Engineer, had turned out correct. It was dangerous to make forecasts; but on this occasion it had proved right. Not only had the rental exceeded that for the same period of the previous year, but, to use their very able Engineer's expression, it had been for the half year a record one. They had picked up, and more than picked up, the falling off occasioned by the reduction in the price of gas. Their coal cost them last half year £326 more; but they consumed an additional 380 tons, one of the effects of which would be seen in the increase of the residual products. The total gas accounted for was 44,305,700 cubic feet, as compared with 42,161,500 feet during the same period last year; and the make per ton was 10,302 feet. While keeping the outlay on repairs and renewals under close observation, the Directors had adopted the policy—and he was sure that in this they would have the support of the shareholders—of maintaining the works and everything connected with distribution in an efficient condition; and they were convinced that in so doing they acted in the true interests of the Company. He thought he was safe in saying that everything was now in such perfect order that after the current half year there would be no great amount expended under this head. There was an item in the balance-sheet under the heading of depreciation fund invested, which they would probably have noticed, because at this time last year it stood at £8553, and on Dec. 31, 1904, at £9083. The explanation of the difference shown on the present occasion was that they had sold some of the securities to provide funds for paying off the £9000 of debentures on July 1; and the proceeds of the sale were included in the balance at the bankers on June 30, which stood at £10,375, as against £2358 at the corresponding period of the previous year. He thought they might expect some reference to a circumstance which had appeared in the papers as having recently occurred at Smyrna. He alluded to the plot which was fortunately discovered in time to avert what might have been a disaster to the town. From all they could gather, the official and other

public buildings seemed to have been the object of the plot; and while there was abundant evidence to prove that this was the case, they could find nothing to show that their works had been in danger. Notwithstanding this, however, every precaution had been taken by the Manager; and the Directors did not consider that there was any reason for alarm or anxiety. It was a pleasure, he could assure the shareholders, to the Board to be able to report that the Company was in a satisfactory and improving condition. In the seven years since they provided a sinking fund, they had been able to reduce out of income the debenture debt by £9000; and there was every indication that the money that had been laid out in extending their operations was bearing good fruit, with a promise of still better results hereafter. This was the account of their stewardship; and he was quite sure it would be considered satisfactory.

Mr. H. W. ANDREWS seconded the motion.

Mr. W. A. HOUNSOM remarked that the position of the Company was so good that they might congratulate themselves all round, and especially upon the management. He noticed from the balance-sheet that the reserve fund, debenture redemption fund, and depreciation fund amounted roughly to £24,000; but in regard to this they seemed to only have absolutely invested £1432 in East London water debentures and £2517 in the debenture redemption fund. This with the £9000 used to pay off debentures, to which the Chairman had referred, represented roughly £13,000 out of £24,000 as being liquid. He was going to suggest that it might be well, if possible, to have a larger amount invested in future, because they all knew that these funds were better if they could be handled in case of emergency than if they were absorbed in the business. This led him to another suggestion, which was that they should bring the form of accounts up to date, and present them to the shareholders in the way in which the accounts of statutory gas companies in this country were drafted. Several advantages would accrue from this, one of which would be that it would add to the stability of the Company on the market.

Mr. HUGHES asked if the works were insured against fire, and also whether it would not be possible, at Lloyds or in some other way, to safeguard themselves at a slight cost, from the results of any further disturbances at Smyrna.

The CHAIRMAN said the Company were insured against fire; and now that for the first time they saw a slight danger in another direction, steps were being taken to see if they could not get more fully covered than at the present moment. The Directors were quite alive to the necessity of doing what was possible in this direction. As to the form of the accounts, the Board would be glad to take into consideration the suggestion that had been made. There were, however, certain points in their accounts which might cause difficulty in bringing them into range with the statutory form. The £12,000 in the reserve fund was, of course, in the works. The Directors quite saw the advisability—in fact, this had been their policy all along—of investing as much money as they possibly could.

The resolution was then carried unanimously.

On the proposition of the CHAIRMAN, seconded by Mr. STRACHAN C. CLARKE, a dividend for the half year was declared on both classes of shares at the rate of 7 per cent. per annum free of income-tax.

Mr. HOUNSOM moved, and Mr. HUGHES seconded, a hearty vote of thanks to the Chairman and Directors.

The CHAIRMAN acknowledged the compliment, and proposed a similar vote to the Secretary, Engineer, and staff.

Mr. A. M. PADDON, in seconding the vote, referred to the question of the accounts; maintaining that the present style was preferable to the statutory form which was prescribed by the Board of Trade for the purpose of keeping the peace between contending parties, while another point was that they had all of them become familiar with the existing arrangement.

The SECRETARY briefly returned thanks on behalf of Mr. Gandon, himself, and the staff.

DEPTH OF GAS-MAINS IN WANDSWORTH.

For some time past correspondence has been going on between the Wandsworth and Putney Gas Company and the Wandsworth Borough Council with regard to the depth at which gas-mains are to be laid in new streets not yet taken over by the Council. The Council, on Jan. 18 last, decided that mains under the carriageways of roads of the above-mentioned description should be laid at a depth of not less than 2 ft. 6 in., and under footpaths not less than 2 feet, from the surface. The Company, however, objected to these depths, and suggested that an agreement should be entered into giving the Company power to lay mains at such depths as they might think fit, but if the depth at which the pipes are laid be less than 2 feet under footpaths and 2 ft 6 in. under carriageways the Company should indemnify the Council against all damages from leakage from the pipes, or explosions of gas therefrom, occasioned by the use of rollers not exceeding 10 tons in weight. The Council, at a meeting on June 3, decided not to approve of the proposed agreement, as it would not meet the objects aimed at when the Council's predecessors obtained the insertion of the clause in the Act. With the view of meeting the Company, however, the Council decided to inform them that gas-mains could be laid in streets included in the section at no less than the following depths: Under carriage-ways, 2 ft. 6 in.; and under footpaths, 1 ft. 6 in. from the surface. The Highways Committee of the Council reported last Tuesday having received a letter from Messrs. Hollams, Sons, Coward, and Hawksley, Solicitors, on behalf of the Company, suggesting that the difference between the Council and the Company should be decided by an engineer appointed by the President of the Institution of Civil Engineers. The Committee had decided in favour of replying to the effect that each case will be separately considered, and that the decision as to the depth of the trench will be in accordance with the circumstances.

On Monday morning of last week, an explosion of gas took place at the Monument Railway Station. No one sustained any injury, but some slight damage was done. The explosion is reported to have resulted from a leakage in a gas-pipe under the staircase.

UP-TO-DATE GAS APPLIANCES AT NEWCASTLE.

A Comprehensive Exhibition.

In accordance with the announcement made in the "JOURNAL" a fortnight ago, a gas exhibition which is on a scale unprecedented in the district, was opened last Wednesday at Newcastle-upon-Tyne. It is being held in a hall in St. Mary's Place, owned by the Newcastle Exhibition, Limited; and as the building is 240 feet long by 100 feet wide, it provides a total floor area of 24,000 square feet. Even this, however, proved insufficient to accommodate all those who were desirous of exhibiting, for many applications for space had to be refused. We are glad to learn that the exhibition (which has been promoted by the Exhibition Company, under the supervision of the Gas Company) has already proved a financial success; and in response to a unanimous request from the exhibitors, it has been arranged to keep it open for three weeks, instead of two as originally intended. The exhibits were selected by, and the management was under the supervision of, an Advisory Committee appointed by the Gas Company; the Secretary of the Company, Mr. Thomas Waddom, being Chairman. The Joint Managers of the exhibition were Mr. John Lewis, representing the Gas Company, and Mr. W. A. Cowie, on behalf of the Exhibition Company; and it says a great deal for the efforts of these gentlemen that the exhibition was completed in every detail at the advertised time of opening, and that there is a general consensus of opinion that it is well arranged, artistic, and completely and carefully thought out. The opening of the exhibition was preceded by a lunch given by the Gas Company to about eighty guests, representing the various districts which the Company serve.

The opening ceremony was performed by Sir William H. Stephenson, who was supported by the Mayors of Newcastle and Gateshead, Lord Armstrong, Sir Walter Plummer, M.P., Mr. George Renwick, M.P., Sir Riley Lord, the Directors of the Company, and others. Before, however, declaring the exhibition open, Sir William delivered a lengthy but highly interesting address. He said this was the second gas exhibition held in Newcastle upon comprehensive lines; the first, which took place in 1902, having been wholly promoted and managed by the Gas Company. The first show was a new departure in gas exhibitions, inasmuch as it was, he believed, the first successful attempt made to popularize gas exhibitions in substitution for the then common exhibitions of cooking and heating appliances organized by the manufacturers of these articles. These latter served their day. The public now required something of a more varied character, and it was provided by the Company by the introduction of good music, short lectures on gas and allied subjects, demonstrations of all classes of cookery, laundry work, baking, gaslight photography, models, up-to-date lighting, and many other interesting things. Since that exhibition, the idea had been developed, and much had been done to improve appliances designed for the use of gas—notably the fittings for lighting purposes. Manufacturers of these articles had at length realized the necessity of giving the public something more artistic than they had hitherto done, and, further, that the articles need not be expensive, if artistic. In fairness to the manufacturers, it must be admitted that the invention of the inverted burner had aided them in their endeavours. At one time it was considered that it was impossible for an incandescent gas-burner to be in any other position than upright when lighted. Now it could be used in any position. At the last exhibition, there were one or two crude exhibits of appliances for the switch-lighting of burners. On the present occasion it would be found that these had been very much improved, and that it was now possible to switch on and off the lights in a room when entering or leaving. There was, however, still room for improvement, which would come. He had been favoured with a private view of an invention, which would, in his opinion, prove a very valuable addition to these appliances. After quoting figures from the Board of Trade returns to show the healthy condition of the industry, and referring to the supersession of electricity by gas for public lighting, Sir William alluded to the prosperity of their particular Company. Year by year, he said, with unfailing regularity, the quantity of gas sold was greater than the previous year. Every effort was made by the Company to anticipate and meet the requirements of the public. Considerably increased discounts were given to large consumers from Jan. 1 last, so that the largest consumers were now paying 1s. 7¼d. to 1s. 6d. per 1000 cubic feet, according to the quantity consumed. There being a large demand for gas-fires and other appliances, they were issued upon the hire-purchase, and in some cases upon the simple hire, systems. Fires were fixed free; and negotiations were in a forward condition with the Newcastle, Gateshead, and District Master Plumbers' Association, whereby the members of the Association would co-operate with the Company in dealing with the gas-fire business to the advantage, he hoped, of the Association, the public, and the Company. On behalf of the Company he thanked the Advisory Committee, under the chairmanship of their Secretary, and the Joint Managers of the exhibition—Mr. Cowie, representing the Exhibitions, Limited, and Mr. Lewis, representing the Company—for their signal efforts in arranging this exhibition so successfully.

Several votes of thanks were subsequently accorded. Lord Armstrong, who proposed that this compliment be paid to the Mayors and Councils of Newcastle and Gateshead, and the Urban and Parish Councils for the presence of so many of their members that day. He was sure their constituents would be pleased, because it showed that they were ready to notice any progress in science and to utilize that progress for the benefit of the public. He thought the gas-fittings displayed would compare with any electric light fittings in existence, and that as a light gas would always hold its own with electricity. Of course, in many ways the electric light offered great facilities, and they had gained a great deal by its use; but for domestic purposes many people found gaslight better for the eyes, and the only difficulty so far had been the greater trouble in lighting. This trouble was about to be overcome; and he trusted that by the time another gas exhibition was held in Newcastle they might be able to light gas-jets with the same facility that they did electric light. The Mayor of Newcastle, in reply, said the exhibition showed the great progress which had been made in using gas for cooking, manufacturing, and lighting purposes. He

referred to the kindly feelings existing between the Corporation and the Gas Company—much of which was due to the efforts of Mr. Waddom. Sir W. R. Plummer, M.P., proposed a hearty vote of thanks to the exhibitors for their co-operation, and to the Newcastle and Gateshead Education Committees for assistance in arranging competitions for school children. He did not think it was pretended that the interest of the Gas Company and the exhibitors was purely philanthropic; but they thought that they had provided an exhibition of utility and of an educational character. Mr. James Mackay replied on behalf of the exhibitors. Sir Riley Lord moved a vote of thanks to the Advisory Committee and Joint Managers; and to this Mr. Waddom replied.

Turning to the exhibition itself, it may be mentioned that the building is lighted by the Sale and Onslow high-pressure system; the pressure at the burners being 35 inches. There are employed 24 lanterns of the "Taj" design, each containing three burners, and giving a light of 1350 candles. The official programme for the week from Sept. 13 to 19 shows how great are the attractions that have been provided. Each day three programmes of music were gone through by the band of the Newcastle Royal Garrison Artillery; and there were numerous lectures on high-class cookery by Miss E. Sanderson. Then there were cooking competitions for girls of 12 to 15 years of age, and several short popular lectures—on "Coal," by Mr. W. Doig Gibb, on "How to Burn Coal Gas," by Mr. W. Hardie, and on "Gas-Engines," by Mr. A. B. Roxburgh. An artistically draped, well-lighted, and commodious tea-room is provided. There are in all 152 stand spaces allotted to 45 exhibitors; and a pleasing feature of the exhibits is their diversity, the stands having been arranged by the Gas Company with a view to this. The following are some of the more novel and interesting exhibits.

A kitchen and laundry has been erected and fitted by the Gas Company, in which frequent demonstrations in cooking and laundry work are shown. The fireplace in the kitchen is fitted with a Wilsons and Mathiesons "Villa" range, which is divided down the centre with a complete plate. In one section is a "Yorkshire" oven and grate and back boiler complete; the whole of the other section being reserved for a gas-cooker. In the laundry are fitted a gas-boiler, gas-washer, gas-dryer, and gas-heaters.

Another successful exhibit arranged by the Company are three shop windows erected specially to illustrate different methods of window lighting. The first is lighted by four 150-candle power Keith burners placed in a line, close to the plate-glass window, on the inside, and the light thrown into the window below by silvered reflectors. The second is lighted from the outside by an arc lamp containing three burners yielding 900 candles. The third, and most effective, is treated with small circular mirror reflectors let into the ceiling of the window, 18 in number, each containing a "Bijou" inverted burner. The effect is charming. There are no shadows; perfect distribution of light being obtained. Among other of the Company's exhibits which have proved most interesting to the public, may be mentioned a coal-testing plant as used at the works, comprising apparatus for testing the gas for illuminating power, calorific power, and sulphur; a pipe illustrating the method of temporarily stopping gas in street mains; and an old meter specially taken out of premises for showing at the exhibition, which has been in constant use for 58 years, and, without having been repaired, is still registering gas correctly.

Apparatus for incubation, shown by Miss Edith Sanderson, First-Class Diplômé of the French Republic in Poultry Keeping, illustrates one of the uses to which gas can be put. The eggs (the incubation of which had been commenced on Miss Sanderson's poultry farm at Coleshill, near Birmingham) were brought a journey of over 200 miles; and in spite of the fact that they had been out of the incubator nearly 24 hours, the chickens hatched out strong and to time. The incubator was by Phipps, of Harborne, Birmingham. In order to show that even delicate flowers are unharmed by the proper application of gas, Miss Sanderson forced lilies of the valley in a propagator heated by gas. Retarded crowns were used, which, by forcing at a high temperature, can be made to blossom in from twelve to fourteen days.

Benson's system of gas control, which appears to work most readily, has been devised for the purpose of switching gas on and off from distant points with the same ease as in the case of electricity. The taps or switches are buried in the wall at some convenient points; and the bye-pass ignition is regulated and controlled by Benson's patent automatic igniter. By means of simple but ingenious two-way cocks, the lights can be turned on or off from two different points—say, at the hall door of a house and on the first landing, or at a bedroom-door and another point close to the bed. The arrangement is shown by Messrs. W. A. S. Benson and Co., Limited.

Messrs. Fletcher, Russell, and Co., Limited, among their varied exhibit, show their new patent ventilated backs for gas-fires. In this arrangement, the induced draught caused by the burner is conveyed through a series of holes in the back of the fire, carried up behind the brick, heated during its progress, and discharged into the fire almost at the top of the brick. This warm current has the effect of deflecting the point of the flame outwards from the brick, thus causing the flame to travel up the outer row of balls, or on the front of the frets, instead of being drawn inwards towards the brick as in the old pattern. The advantages claimed are greater efficiency, a larger fire surface, and a brighter fire for the same gas consumption.

Messrs. Wilsons and Mathiesons have had designed by an architect "The Sheraton Fire." The design is claimed to be in high art for use in artistic rooms. They also have the "Wilson" hood water-heater attached to one of their cookers. The hood (over the hot plate) is provided with a copper tank, the water in which is heated by the waste heat from the oven flue and supplemented by a burner placed under the tank itself.

The Richmond Gas Stove and Meter Company, Limited, show an instantaneous water-heater which they claim is a novel and economical piece of gas apparatus constructed to give the greatest possible duty with a moderately small consumption of gas. It is made with a view to meet the requirements of those who have not room for a larger water-heater; the space occupied by the whole apparatus being only 17 inches long by 6½ inches wide. The principal feature of this new heater is the lighting and extinguishing automatically turning on or off the water. The inlet of the water to the heater is arranged in such a manner that it also lights the burner and sets the heater in working order; and in the same way turning off the water also shuts off the gas, and consequently stops the heater. It may be mentioned that the water is boiling hot, and will do for tea or baths, lavatories, washing up, &c. The consumption of gas is said to be comparatively small, when the large volume of hot water produced is considered. Another feature to be observed in this heater is the ease with which it can be cleaned; the apparatus being so simply constructed that the burner can readily be got at. There are no screws to take out, or couplings to disconnect. In fact, an ordinary servant girl can take it to pieces, clean it, and replace it with a minimum of trouble. The burner is not at all complicated, and is very little different from those in the firm's "Model" cookers.

The Welsbach Incandescent Gaslight Company, Limited, show for the first time their 1000-candle power Welsbach-Kern self-intensifying burner and lamp. The unique feature of the burner is four bunsen tubes, each one taking an equal proportion of the air and gas necessary for perfect combustion, and the whole being passed into a central mixing chamber, where it again has to pass through a perforated cone, thus ensuring a perfect mixture of gas and air. The result is a steady flame of intense brilliancy, giving, it is claimed, 1000-candle power. The Company also exhibit an inverted burner on the Kern principle, which gives a duty of 22 candles per cubic foot of gas consumed.

The Davis Gas Stove Company, Limited, show their "Gascol" patent convertible gas and coal range, which is constructed with a view to economy in both gas and coal consumption. It is convertible at a moment's notice for use with either gas or coal; and the gas connection can be made either at the back or the front of the range.

Upon the stands of Messrs. R. & A. Main, Limited, is to be seen a combination sitting-room grate, fitted with a copper back boiler, and an alternative gas-boiler for use when the water from the coal-range boiler is not hot enough, or when the coal-fire is not lighted. This arrangement has been specially designed for use in flats in Newcastle and Gateshead. The firm also show the "Main" range cooker, which comprises an oven with hinged hot plate at side for lying flat against the side of the oven when the plate is not in use.

Mention should also be made of Messrs. Jones and Still's patent boiling-water apparatus, coffee-making machine, milk and cocoa urns, and egg-boiler combined. This arrangement takes up very little room on a counter; and the consumption of gas is claimed to be very small. Then there is a suite of rooms erected and furnished by Messrs. Robson and Sons, of Newcastle, consisting of a hall in fumed oak, a Sheraton dining-room, and a drawing-room *à l'art nouveau*. The rooms are most substantially built, and are beautifully decorated and furnished. "Bijou" and upright burners are used, and the whole are controlled by means of pneumatic switches. Each room has its switch-board. Specially chosen gas-fires are fitted.

Seeing that the exhibition is some distance away from the main thoroughfare, an attraction of gas-lights has been specially devised and erected in a prominent position, which both advertises the exhibition and indicates the road to it. The attraction takes the form of two triumphal arches, one on the pavement at either side of the road, and comprised of four ornamental metal columns set in the form of a square, each carrying a 300-candle power self-intensifying lamp. From the tops of the pillars, and just at the base of the lanterns, springs a simple archway of 1½-inch iron gas-pipe supporting a large opal globe at the crown, containing a transparent coloured cylinder revolving around an incandescent burner. Above the globe again is a flambeau held in position by ½-inch iron gas-pipe, following closely the curve of the globe from the 1¼-inch pipe at its base. Then, again, the two pillars, forming the side of the square facing the main road, are joined by a curve of ½-inch pipe, from which are suspended by chains thirteen small lanterns. Each lantern is lit with a flat-flame burner fed by flexible tube, the illumination throwing into bold relief an opal letter, and forming the illuminated sign "Gas Exhibition."

The following is a list of the firms exhibiting, in the order in which their stands are numbered: R. & A. Main, Limited; Thomas Glover and Co., Limited; Newcastle-upon-Tyne and Gateshead Gas Company; Miss Edith Sanderson; A. E. Podmore and Co.; Henry Walker and Son, Limited; G. J. Hutchings; Sawer and Purves; George Orme and Co.; the Automatic Light Controlling Company, Limited; R. Laidlaw and Son, Limited; D. Anderson and Co., Limited; E. Davis; William Green and Co., Limited; National Gas-Engine Company, Limited; The Ramie Company, Limited; The Richmond Gas Stove and Meter Company, Limited; John Wright and Eagle Range, Limited; Emley and Sons, Limited; E. C. Hayward and Co.; Anti-Vibration Incandescent Lighting Company, Limited; Thomas Doyle; Fletcher, Russell, and Co., Limited; T. Crossling and Co.; Welsbach Incandescent Gaslight Company, Limited; George Bray and Co., Limited; W. M. Still and Co.; W. A. S. Benson and Co., Limited; S. Clark and Co.; J. Stott and Co.; Alder and Mackay; New Inverted Incandescent Gas-Lamp Company, Limited; J. Rowell and Sons; Crossley Bros., Limited; Robson and Sons, Limited; and Wilsons and Mathiesons.

Bolton Gas Workers' Dispute.—The conference which had been arranged between the Bolton Gas Committee and a joint deputation representing the Trades Council and the gas workers duly took place on Friday. It will be remembered that the situation originally arose out of the application of the gas workers for an advance of wages and an alteration in their conditions of employment, and 130 notices were tendered, 80 of which were subsequently withdrawn, while the remainder, who were connected with the Gas Street works, remained firm in their attitude, and have been out about eight weeks. Interviews have taken place between the Committee and the men's representatives; but hitherto without a settlement being arrived at. It is stated that Friday's meeting occupied all day, and closed at six o'clock without a definite result being arrived at. The Committee are reported to have offered certain concessions; and when the situation has been further considered by the men, another meeting will probably be held, at which a settlement may perhaps be come to.

THE EXPLOSION AT THE SOUTH SHIELDS GAS-WORKS.

In the "JOURNAL" for the 5th inst. (p. 643) there appeared a brief intimation of an explosion which occurred at the South Shields Gas-Works the preceding Sunday afternoon; and from particulars since received from the Engineer, Mr. T. H. Duxbury, we are now able to supplement the information then given. Gas making at the works was suspended during the morning shift for the purpose of fixing some valves to the foul main inside the retort-house; and during the execution of this work, a certain amount of air gained admission to the foul main. When the afternoon shift of stokers came in, gas making was to be resumed, and eighteen retorts were drawn—namely, three in each bed—so that charging could take place quickly. After three retorts in No. 1 bed had been charged, the explosion took place, resulting in a 24-inch cast-iron cross-pipe on the foul-main being shattered. Pieces were hurled in various directions, some of them passing through an opening in the retort-house gable, and penetrated the side sheeting of a gasholder. It may be pointed out that the foul main encircles the retort-house, and valves are arranged for directing the gas in alternative directions; and, further, either No. 1 or No. 2 retort-bench can be isolated by closing some of these valves. At the time the explosion occurred, No. 2 section, comprising six beds of retorts, was isolated by means of two valves being closed—one at each end of the section—and the 24-inch cast-iron cross-pipe which was shattered adjoined one of the aforementioned valves which was closed—namely, the one opposite the end of No. 2 bench. The men were about to start running the exhauster; but they had not actually got it going when the explosion took place. Mr. Duxbury, who was not on the works at the time, was telephoned for; and after temporarily repairing the gasholder, attention was turned to the retort-house where, fortunately, as far as could be seen, a blank flange on the open end of the foul-main and the closing up of a valve was all that was required. This having been done, gas making was resumed on another bench of retorts first; and subsequently the original bench was also recharged without any mishap. Later, however, it was found that there was a dip-pipe broken in the hydraulic main of No. 4 bed; and Mr. Duxbury's investigations lead him to believe that this was the cause of the explosive mixture becoming ignited.

STOCKPORT CORPORATION GAS SUPPLY.

The Past Year's Working.

In the course of a discussion in the Stockport Town Council (as reported in last week's "JOURNAL," p. 700), reference was made to the report of Mr. S. Meunier, the Engineer, on the working of the Corporation gas undertaking for the year ended March 31. Mr. Meunier stated in his report that the gross profit for the year was £28,416, against £32,387 for the previous year; the net amount left, after paying interest and sinking fund, being £11,020, as compared with £14,923. To account for this, the first thing to be taken into consideration was the decrease in price of 3d. per 1000 cubic feet, which came into force in the September quarter of last year. The diminution in revenue from this cause amounted for the nine months to £5638. However, the increase in the quantity of gas sold—namely, about 28½ million cubic feet, or 4·59 per cent.—had affected the rental and reduced the actual loss from this source to £1484 only, to which had to be added an extra £1018 paid away in discounts and £136 less paid for public lighting, making a total reduction in the revenue from gas of £2638 in round figures. Of this increase in discounts, £803 was for gas used for trade purposes. There was also a diminished revenue from coke of £606, from ammoniacal liquor of £335, and from meters and fittings of £770. No doubt tar also would, as had been found pretty generally in other gas undertakings, have shown a decrease had it not been for the improved schedule obtained in June. As it was, however, there was a balance to the good on this item of £415. Unfortunately, the residual products market at the moment showed very little sign of improvement. There had been an increase in the maintenance expenditure of £936, due to the fact that a number of special repairs had to be carried out during the year. Then there was an increase of £2238 in rates and taxes. Of this, £1000 was brought forward from last year's accounts as being in dispute. Cartage of coal showed an increase of £179; and stokers' wages, of £794. On the other hand, coal and oil cost less by £1219 and £578 respectively; while there were also reductions in materials used on works, purification, &c., of £575, tar, as previously mentioned, had brought in an additional £415, sundries (which would include spent oxide) £300, and meters and fittings £213. Management expenses were reduced by £431, due to a lessened expenditure on law charges. The loan of £6000 advanced some years since had been entirely cleared off; the £500 paid last year having been the last instalment. As reported twelve months ago, the previous highest gross profit shown up to then had been in 1895, when it reached £28,137, with gas at 2s. 8d. per 1000 cubic feet and a differential rate of 6d. per 1000 feet. This year's figure of £28,416, therefore, took second place to last year; but the price of gas now stood at 2s. 4d. per 1000 cubic feet, with a differential rate of 4d. per 1000 cubic feet over a very much smaller area (due to the enlargement of the borough), and with discounts for trade purposes varying from the ordinary price to as low as 1s. 6d. per 1000 cubic feet. The question of cheaper gas was one which was agitating the minds of members of committees and boards of directors all over the country, in consequence of the ever-increasing competition (more especially of producer-gas plants) now constantly met with; and it was with these facts in mind that he would advise everything being done to encourage the paying as against the non-paying consumer by reductions in price and such other advantages as might reasonably be afforded. In order to do this, it would also be absolutely necessary to carry out such extensions as would tend to a lessening of the cost of production; and with this in view, he would suggest for early and serious consideration the advisability of utilizing the land acquired some time since, contiguous to the railway sidings at Portwood, for a new works, which would not only take up such extensions as might be required from time to time, but also do away with the necessity of using the plant at Heaton Lane, with the exception of the gasholders and governors. Such land as would not further be required there could then either be let or sold. Another point to which serious consideration should be given was the question of a reduction in illuminating power. In view of the enormous strides which had been made during recent years in the direction of incandescent lighting, many towns had found it a distinct advantage to reduce the lighting quality of their gas, together with the price, and many others had either applied, or intended to apply, to Parliament for powers to reduce the obligations in this respect which their present Acts imposed upon them. The London and Suburban Companies had reduced to as low as 14 candles; and among many other towns that had acted, or were about to act, in a similar manner were Glasgow, Edinburgh, Leicester, and Manchester. The latter city had been gradually reducing for the last five years, until their average for the twelve months ending March 31, 1905, stood at 17·04 candles, as against Stockport's 18·08 candles and their original 19 to 20 candles of a few years back. The report of the Salford Corporation Gas Committee to the Council also stated that a reduction is very advisable, but that it would first be necessary in their case to get parliamentary sanction. The quality of gas supplied throughout the United Kingdom showed an average of 17·2 candles; while if the Scotch towns (which averaged 21·9 candles) were eliminated, the average was reduced to 16 6 candles. Stockport, under its Improvement Act, was under no restrictions whatever as to standard of quality; so that to make an alteration merely needed a resolution from the Committee and the necessary confirmation of the Council. During the year, 970 new services had been laid, 457 defective ones relaid and repaired, 23 broken mains attended to, and 1628 defective meters repaired and refixed.

Tables appended to Mr. Meunier's report show that the number of meters in use is 26,393, of which 8656 are prepayment. The quantity of gas made during the past year was 704,193,000 cubic feet; the amount accounted for being 654,271,000 feet. The largest make in 24 hours was 3,720,000 feet, and the largest delivery 3,933,000 feet. The make of gas per ton was 10,797 feet, and the illuminating power 18·08 candles. The leakage amounted to 6·81 per cent. A sum of £86,331 was received for gas, including public lighting, as against £87,951 for the preceding twelve months. In this connection, however, it must be pointed out that a reduction of 3d. per 1000 cubic feet came into force in the September quarter of last year. During the year, 14,186 tons of cannel, 34,770 tons of coal, and 601,426 gallons of oil were carbonized; the residuals made for sale being: Coke 21,731 tons, tar 3571 tons, liquor 4323 tons, and sulphocyanide (plant started in December) 22,021 lbs. At March 31, the capital account stood at £249,601. On revenue account there was an income for the past year of £100,629, and an expenditure of £72,213; the gross profit being £28,416, or 11·38 per cent. on the capital. Interest absorbed £8303 and sinking fund £9092, leaving a net profit of £11,020, or 4·41 per cent. on the capital. Of this, £9000 was appropriated to the rates; £1920 was placed to reserve, and £100 to insurance. The price of gas is now 2s. 6d. per 1000 cubic feet within the borough, and 2s. 10d. outside, less 2d. per 1000 feet discount. Differential discounts are allowed on gas used for industrial purposes, up to 10d. per 1000 cubic feet.

FATALITY AT THE CARCASSONNE GAS-WORKS.

Destruction of a Gasholder.

The last number of the "Journal de l'Eclairage au Gaz" contains an account of a shocking accident which occurred at the gas-works at Carcassonne, at half-past nine on the morning of Sunday, the 27th ult., by which two men were killed and four others more or less seriously burnt. Three workmen, named Vidal, Veaux, and Parent, were repairing the crown of the holder which supplies the western side of the town. Parent went down to get a tool, and had not proceeded many yards before he was startled by the noise of a violent explosion behind him. A sheet of flame shot about 300 feet into the air, and began to spread over the works. In a few seconds the holder had dropped into its tank. The crown had burst from one side to the other, just where Vidal and Veaux were at work; and the two unfortunate men disappeared beneath the water. Three other men who were carting coal in the vicinity of the holder had their hands and bodies burnt. As soon as news of the accident reached the town, a number of firemen and police made for the scene; and the Manager of the works (M. Rodier) at once took steps to clear the tank. By mid-day six syphons were in operation; and at half-past two the body of Vidal was discovered. He was not at all disfigured, and his clothes were intact. The medical man who was summoned stated that the cause of death was asphyxiation. At five o'clock there was still a depth of about 10 feet of water in the tank. A steam-pump was therefore set to work; and by four o'clock the following morning all the water had been drawn off. The body of Veaux was discovered at the bottom of the tank, about 6 feet from the spot where Vidal was found. As in the case of his unfortunate companion, he was not disfigured in any way. There was a slight indentation at the top of the skull, but the skin was not lacerated. In his case also death was attributed to asphyxiation. The injuries sustained by the other workmen were not such as to necessitate attention outside their own families. At the time of the accident the holder contained about 105,000 cubic feet of gas and 650,000 gallons of water. The second, and smaller, gasholder, which stood at the side of the other, was neither injured nor forced out of position; but all its tar coating was melted. At the time the account of the accident appearing in our contemporary was prepared, the cause of the catastrophe had not been ascertained. It was at one time thought that the men had been smoking; but it appears there is no ground for supposing they were so imprudent. There was no interruption in the lighting of the town; enough gas being available from the smaller holder.

SALE OF THE HALIFAX TAR-WORKS.

Last Wednesday, the Halifax Town Council held a meeting to discuss the report of a Special Committee appointed to consider the advisability of continuing to operate the tar-works.

The report stated that in 1898 the Gas Committee were of the opinion that they were not receiving a true market price for the tar produced at the gas-works; and it was suggested that this was brought about by combination between tar distillers. It was therefore decided to erect the works, the present capital expenditure on which was £20,893. The production of tar at the gas-works was 4750 tons per annum; but the Lennard still, which was installed at the tar-works, could work up in 63 days the whole of the yearly production of tar. In order to ensure success, continuous work was necessary. Moreover, the storage accommodation was limited, and a continuous run of sixteen days would completely fill the pitch bays; while the refining plant and the storage cisterns were not sufficiently large to deal with the products from continuous working. During the nine months ended March 31, 1904, 2252 tons of tar were distilled; and the result was a net loss of £1513. During the year ended March 31, 1905, there were distilled 3595 tons of tar, and the net loss was £3073, or a total loss over the 21 months of £4586. After allowing for charges which would not recur, the actual loss on the 21 months was £3100. On the other hand, however, the cost of renewals would increase, and the amount paid to the sinking fund account had been calculated on a forty years' basis, which was too long a period for the plant. The Committee had gone very carefully into the question of management; and, though satisfied that improvements in the financial results could certainly be obtained, they were of the opinion that, under the present burden of over-capitalization, standing expenses, excess size of some parts of the plant and under size of others, heavy working costs, &c., it was far more probable the works would never be a financial success. After the consideration of offers from two firms of tar distillers, the Committee recommended the acceptance of that made by Mr. Henry Ellison, of Cleckheaton. The terms of this offer were that the Contractor should pay the Corporation £6000 for the still, producers' refinery plant, storage cisterns, and manufacturing plant generally; that £3000 of the purchase-money be paid at once; that the remaining £3000 be deposited with the Corporation, at the current rate of interest, as security; that £300 per annum for ten years should be taken therefrom and credited to the Corporation as instalments towards the payment of the remaining purchase-money due; that the Contractor should pay the Corporation £300 a year for rent of buildings and site, at any rate for a period of not less than three years; that the Corporation should agree to supply the Contractor for 21 years with 4000 tons of tar per annum, at a price based on the average of the prices quoted in the "JOURNAL" each month, and an allowance of 7½ per cent. added; that at any time after three years a revised scale might be asked for and the question submitted to arbitration; that for every ton below the average of 4000 tons to be supplied the Corporation should pay the Contractor 1s.; that the Contractor should supply the Corporation with pitch and creosote at prices quoted for export at east coast ports; and that the Contractor should pay all rates and insurance premiums upon the plant and stock. The report stated, in conclusion, that after careful consideration in every detail, the majority of the Committee felt convinced that the tar-works could be more profitably worked by private enterprise, and that it would eventually be to the interest of the Corporation to dispose of the plant and make the first loss the last and the least.

The adoption of the recommendations contained in the report was formally moved by Mr. J. Collinson, the Chairman of the Special Committee. The motion having been seconded, Mr. Broadley, speaking against the report, said he was confident that by accepting the offer the Council would be making the worst instead of the best out of the works. They all realized that at least half the capital would have to be sacrificed; but to sacrifice about two-thirds was a very drastic measure. If the Corporation wrote off the capital to £8000, and replaced the present plant by two or three old-fashioned pot-stills at a cost of £1200, they could utilize their tar and make the works pay. The worst feature of the proposal was that the Corporation would be tied up as to tar output for 21 years. No one could tell what lay undeveloped in the field of chemistry in connection with tar; and therefore it was unfair to tie up their output of tar for twenty-one years. They were practically giving away works which in five years they could make one of their best-paying concerns. Mr. Swaine said he did not think the works had really had a fair chance; but the Committee's recommendation was a common-sense one. For the sale of the works the Corporation practically received £900 a year, while 4 per cent. on £21,000 was £840; so they would receive more than 4 per cent. on the present total capital. Alderman Smith believed the great fault was that in starting the works the Corporation were too ambitious. They could not dispose of the present plant as scrap for as much as it would sell as a going concern. If they did scrap it, they would have an enormous loss, and would have to spend more money on pot-stills. The Council had as many municipal undertakings as they could very well stand. Any other course but that the Committee proposed was uncertain. Mr. Blatchford contended that the Committee should further consider the matter, while Alderman Crossland said the management at the tar-works had been a farce all along the line. It had been cuff-and-collar management. Mr. Morley urged that, with reduced capital and good management, the Committee could make the works pay. Mr. Hainsworth felt confident that at the end of the three years the Corporation would lose the rent of the buildings, and consequently the rates and insurance. The buildings would then be a standing debit against the Corporation, and they could be very well used for anything. Mr. Parker said it was foolish of the Corporation to offer to a private individual what they had never offered to themselves. He asked the Town Clerk if the Local Government Board could not come upon the Corporation to repay at once the outstanding loan for the works, if the proposal to sell was carried. The Town Clerk replied that he did not think this would affect the question at all.

The motion was carried; 31 members voting for it, and 14 against.

DEAR & UNPROFITABLE ELECTRICITY AT FAVERSHAM.

It must have been with very mixed feelings that the General Purposes Committee of the Faversham Town Council recently heard read (and adopted) the minutes of a meeting of the Electric Supply Sub-Committee. These were to the effect that the Deputy-Mayor (Alderman H. Q. Child) intimated his intention of not proceeding with a resolution of which he had given notice—that some other description of electric lamp should be substituted for the existing arc lamps in the streets, but that he would instead propose at the next meeting that an intensifying gas-lamp should be fitted up, with a view, if the results were satisfactory, of substituting this system for the arc lamps. A report was received from Messrs. Talbot and Stevenson, the Consulting Engineers, stating that it was not, in their opinion, advisable to do away with the street arc lamps, but that the cost might be reduced from £22 to £20 per annum. It was accordingly resolved that the price be so reduced, and that the rate for other lamps be lowered from £4 10s. to £4. Mr. Rogers gave notice that at the next meeting he would bring forward the question of substituting some other description of electric lamp for the arc lamps. The Town Clerk submitted an estimate for the half year ending March 31, 1906, which showed an outlay (including charges for interest and repayment of loan) of £1095. As against this, the following revenue was anticipated: From private consumers, £225; public lighting (110 ordinary lamps at £4 per annum, and 10 arc lamps at £20), £320; extras (including rent of meters), £10. There was thus a total estimated income of £555 to place against an expenditure of £1095—leaving an amount of £540 to be provided out of the district rate. That the electric lighting of the streets is dear, in addition to the undertaking generally being a failure as a commercial proposition, will be manifest when it is pointed out that the arc lamps are turned out every night at 10.30; while the other electric lamps are Nernst 75-candle power ones, at the reduced charge of £4 per annum, as compared with the 90-candle power incandescent gas-burners provided and maintained by the Gas Company at £3 14s. a year. It is stated that the Nernst lamps are frequently switched off in the morning three-quarters of an hour (and sometimes even more than this) before the Gas Company are permitted to extinguish their first lamp.

THE WORTHING GAS COMPANY'S EXTENSION SCHEME.

The Chairman on the Refusal to Grant a Provisional Order.

The Chairman of the Worthing Gas Company (Mr. H. H. Gardner), in the course of his remarks to the shareholders at the half-yearly meeting, referred to the fact that the present accounts had to bear a charge of £429 in respect of the abortive attempt to obtain power to manufacture and store gas over an increased area on the present site.* He said that, of course, the Directors were disappointed that, owing to opposition they had no reason to expect, and ending in results which the facts by no means warranted, they were unable to announce that reduction in the price of gas, and correspondingly increased dividend, which both consumers and proprietors were looking forward to, and by which both would have been benefited. The opposition of, and benefits gained by, a hostile few had in the present instance been to the manifest disadvantage of the many. They must now look upon the realization of such hopes as deferred. He should, however, fail in his duty if he did not remind the meeting that, in the inquiry which ended so disappointingly, the opposition at least established the fact that the gas-works were in good order, and were conducted in a manner which reflected nothing but credit. This, of course, was satisfactory to all concerned, and especially to the Engineer and Manager (Mr. W. A. Walker), whom he heartily congratulated. Turning to the working of the Company, he pointed out that, taken in comparison with twenty years ago, the capital now stood, in proportion to the business done, 43 per cent. lower than it did then. It was satisfactory to find that the inroads made by the Corporation electric light among the large houses and shops had been fully compensated by the fitting up of gas lighting in small houses and the extended use of cooking stoves. He trusted that this latter section of the ratepayers would not be much longer called upon to contribute through the rates towards the cost of the electric light, but that such prices would be charged for the current as would cover the total cost of maintenance and production. As large ratepayers, the Company had the right also to say that they were among those who questioned the wisdom of electricity for public lighting. Important places were returning to gas for this purpose, which, to say the least, was very suggestive. The net results of the half-year's working was a profit of £3491, as against £3099 a year ago. The report was adopted, and 10 and 7 per cent. dividends declared.

GAS-WORKS EXTENSIONS AT HONLEY.

Local Government Board Inquiry.

An inquiry has lately been held at Honley, by Mr. M. K. North, on behalf of the Local Government Board, respecting an application by the Urban District Council for sanction to the borrowing of £8000 for the purpose of gas-works extensions. There was no opposition.

The Clerk to the Council (Mr. James Sykes), in placing the facts before the Inspector, stated that the population of the area was estimated at 5033; the assessable value for district rate purposes being £16,714. The reason for the present application was that the consumption of gas had been considerably increased. The former Honley Gas Company was incorporated in 1856; and in October, 1900, the Council decided to purchase the works. After friendly negotiations, the price was fixed at £18,500, or about 22½ years' purchase of the average profits of the

* See last week's "JOURNAL," p. 698.

preceding five years. The purchase was completed on Sept. 30, 1901; and the amount paid was £18,500. The expenses were £710, £410 of which was borrowed; the remainder of the costs being paid out of revenue. The sum of £1490 had been repaid on capital account, leaving the present debt at £17,420. The profits in 1895 were £925, in 1898 £900, in 1902 £583, in 1904 £1116; in 1905, £1134. The gas sold in 1900 was 12,844,700 cubic feet; while at the present time it was 19,563,000 feet—showing an increase of 6,718,300 feet. The increase in the meters in use was 436; the number in 1900 being 869, and now 1305. During the present year, from Jan. 1 to Aug. 31, the increased make of gas over the corresponding period of last year was 1,436,500 cubic feet, or 11·7 per cent.; and this had followed continuous increases since 1900. The Council commenced to supply gas for cookers in December, 1901, at the rate of 2s. 3½d. per 1000 cubic feet. There were now 40 cookers on hire, 41 on hire purchase, 129 free slot cookers, and 140 free breakfast cookers. This was a considerably greater number than was expected when the work was commenced; and on account of lack of capital, efforts had not been made to increase this branch of the business. The district was growing, and there would be an extra demand for gas and cookers. The maximum producing capacity of the old plant was 130,000 cubic feet per day; and on Dec. 21 last 115,100 cubic feet were sent out. The storage capacity was 80,500 cubic feet, or equivalent to only 17 hours' supply in midwinter. The area of the old purifiers was 1014 cubic feet, which gave a maximum capacity of 3000 cubic feet per hour on the basis of fifteen minutes' contact. The maximum hourly make of gas during the last winter was 6800 cubic feet. In the early part of this year, the attention of the Council was called to the requirements necessitated by the growth of the undertaking. They carefully considered the matter; and in March resolved to apply for sanction to borrow £8000. This sum was required for alterations to the retort-house, for alterations to the existing purifier-shed and the addition of new purifiers, and for stoves, new meters, gasholder, and other contingencies. The Council had resolved to commence the works, in order that they should be able to meet the increased demands of the coming winter. It would not be necessary to have any additional land.

The Gas Manager (Mr. H. Marsden) produced the plans; and at the close of the inquiry, the Inspector visited the site of the works.

GAS-WORKS RESULTS AT CONWAY.

The abstract of accounts just issued by the Borough Accountant of Conway (Mr. Hugh Parry) deals, among other matters, with the working of the gas undertaking during the year ended March 31 last. The expenditure on revenue account amounted to £2334, as against £2241 in the previous year; while the income was £3786, compared with £3839. There was thus a gross profit of £1452, against £1597. After deducting instalments of loans, interest, and income-tax, the net balance for the year amounted to £242, compared with £483. During the year a further reduction of 3d. per 1000 cubic feet was made in the price of gas to private consumers; and the charge for public lighting was adjusted in accordance with the Corporation's Provisional Order, which states that an allowance of 15 per cent. may be made in regard to gas used for this purpose. By these reductions the consumers benefited to the extent of £266, and the ratepayers to the extent of £93—thus accounting for the decreased net profit. Out of the accumulations of net profit, £240 was placed to reserve; leaving £1472 to be carried forward. During the year, 71 cookers were let out on the hire-purchase system; while four cookers and eight grillers were sold. The expenditure on this account amounted to £315, and the income to £326; showing a profit on the year's working of £11. There was an increase in the make of gas of 732,000 cubic feet, and in the sales of 913,100 feet; while the leakage was reduced from 9·4 to 7·77 per cent. During the year, 100 new consumers were added—50 ordinary and 50 automatic. The net cost of gas per 1000 cubic feet sold was 3s. 4·67d., as against 3s. 6·09d. the previous year. As to residuals, 724 tons of coke were sold at an average price of 11s. per ton, 140 tons of tar at 21s., and 237 tons of liquor at 7s.

GERMAN INCANDESCENT GASLIGHT COMPANY.

The German Incandescent Gaslight (Welsbach) Company, which recently acquired the shares of the Richard Feuer Company, have now carried through a similar transaction with the Export Incandescent Gaslight Company of New Weissensee. By this means, the Berlin "Tageblatt" states that the Welsbach Company have removed from their path two of their most important competitors, and assured themselves of a good influence in the export trade, while at the same time taking up the position of a trust, inasmuch as the Company, instead of dissolving the other two, retain the shares in their portfolio. Nevertheless, it would be a mistake to speak of the Welsbach Company having a position of monopoly, as rivalry in the incandescent gaslight industry is still very considerable; and though many of the remaining independent factories are only unimportant, there are yet a series of others which have an extensive manufacture. The Company took up a monopolistic position formerly, when the omnipotence of their patent was believed in; but this could not be maintained after the Reichsgericht decided that the manufacture of other forms of incandescent mantles did not clash with the Welsbach patent. The Welsbach (German) Company even fell behind other companies, as they, by means of arrangements with certain of the foreign Welsbach Companies had laid themselves under a prohibition in regard to the export trade; and when the several agreements expired, the Company found, on resuming the export business in 1904, that it was difficult to conquer the field which had for years been occupied by competitors. It is therefore suggested that this is perhaps the principal reason why the Welsbach Company abroad have become associated with the rival undertakings which occupy a really good position in the export market at the present time.

FATALITY AT THE EAST GREENWICH GAS-WORKS.

An inquest was recently held on the body of an engine-driver, named Robert Percy, who died as the result of injuries sustained by falling from a hopper at the East Greenwich works of the South Metropolitan Gas Company. The foreman stated that deceased (who was a teetotaler) was a very reliable man. The accident happened while the deceased was putting a belt over a pulley on a hopper, which was about 28 feet from the ground. Witness had been up with him and told him to be careful, and was descending when he heard a thud, and saw him on the ground. He could not account for the fall; there was no obstruction. The machinery was not in motion. Deceased was wearing new boots; and these might have caused him to fall. He would frequently be at the top of the hopper for purposes of oiling. Henry Amos, a stoker, who assisted to take the man to the hospital, said that he was conscious, but never said how he came to fall. Mr. Joseph Tysoe, the Chief Engineer at the works, said that deceased was a very steady man, and was used to going on heights, as he was apprenticed to seafaring. There had never been a similar accident. Whenever the slightest mishap occurred, he called together twelve workmen to inquire into it; and if any suggestions were made, they were carried out. Mrs. Percy would, as in all other cases, be provided for. The Jury returned a verdict of "Accidental Death," at the same time expressing their appreciation of the efforts of the Company to obviate accidents to their workpeople.

ELECTRIC LIGHTING IN PARIS.

Until 1888—says "Engineering"—there seemed to be no prospect of any central electric station ever being put down in Paris. The delay was not due in any way to lack of enterprise on the part of French firms, but solely to the action taken by the Paris Municipal Council, who had systematically ignored all private schemes in their desire to establish, as soon as they found it advisable, a vast scheme of their own for the production and distribution of current. They feared the possible formation within the Metropolitan area of a Company for the supply of electric light and power on the lines followed by the Gas Company. With ultimate municipalization as the primary object in view, the Council, however, drew up, in 1888, a programme describing with great minuteness the conditions under which they were willing to proceed in the matter. They meant to grant a number of concessions, in order, so they said, to prevent the formation of a monopoly; but their real aim in multiplying the concessions was to facilitate ultimately the acquisition of the various systems by the Council. Paris was, therefore, divided into districts, called *secteurs;* and each of these was made the subject of a separate concession. At no time might one district amalgamate with a neighbouring one. Each district included both a portion of the centre of the city and the corresponding quarters extending to the town boundary. The Municipality reserved to themselves the right to authorize any outside firm to lay mains within any district forming the object of a concession. The word "concession" was maintained, though it proved to be in reality a misnomer. The Municipality also reserved the right to lay mains on their own account, should they at any time contemplate a separate Municipal undertaking. They further put down an independent Municipal Central Station at the Halles, for lighting the markets and supplying customers in the vicinity. Their alleged object in doing this was to ascertain the best system of current distribution.

The principal clauses and conditions binding those Companies who were courageous enough to put down central stations under "concessions" from the Municipality having been summarized, our contemporary proceeds: The most onerous clause, and one which had a large influence on the selling price of the current generated by the Companies, was that which governed the duration of a concession—eighteen years only, with absolute prohibition (under penalty of cancellation of the concessions) for one concessionnaire to combine with another, or to hand over his rights to a third, without authority from the Municipality. Should a concessionnaire Company fail, the concession would become null and void, and the Municipality would be at liberty to purchase the plant or transfer the concession.

Subject to a maximum of 15 c. per hectowatt-hour (15d. per kilowatt-hour) for lighting, and 6·2 c. per hectowatt-hour (6½d. per kilowatt-hour) for power, and to special conditions for the current required by the Municipality, the Companies were at liberty to draw up their own tariffs.

The Muncipality also included in their rules and regulations, clauses compelling the Companies to allow specially favourable conditions to the *personnel* of the latter. The working day was to be of nine hours; and the wages were to range as follows: 8d. per hour from 5 a.m. to 6 p.m.; 1s. per hour from 6 p.m. to midnight; and 1s. 4d. per hour from midnight to 6 a.m. These rates were subject to revision every five years, in the same proportion as the "Municipal Series of Wages," the latter having been established solely with a view to satisfy the men, who are all on the voting-lists, without regard to the commercial or industrial needs of the community.

Nor did the liabilities of the concessionnaires end with the above. They were further required to pay the Municipality an annual royalty of 160 frs. (£6 8s.) per mile of leads laid, *plus* 5 per cent. of their gross receipts, or 6 per cent. of their gross receipts when the generating stations were outside the city boundary, to make up for the town dues they evaded on all the goods required in the station. The Municipality further reserved the right to redeem the concession at any time after the first ten years; the purchase price of the concession to be an annuity equal to the average net receipts of the three preceding years, payable until the expiration of the concession. The price to be paid by the Municipality for the mains, leads, plant, furniture, land, buildings, &c., when purchasing before the expiration of a concession, was to be determined by valuation. Should a concession not be redeemed by

the Municipality, the latter became on its expiry the owners of the mains and leads only; but they might cause the mains and leads to be removed should they not require them, and at the Company's cost. In this eventuality, further, the Municipality did not guarantee that they would take over the central stations and the bulk of the Company's plant.

Notwithstanding the Draconian severity of the above conditions, six Companies put in tenders for concessions in 1888; and four of these were able to deposit the security required, and took steps for working their sections. These Companies were the following: Compagnie Continentale Edison; Société d'Eclairage et de Force; Compagnie Victor Popp (which has since become the Compagnie Parisienne de l'Air Comprimé); and Société du Secteur de Clichy. The concessions of these Companies come to an end in April, 1907. In 1890, two other Companies obtained the concessions for the two remaining sections. These were the Société du Secteur des Champs Elysées, and the Société du Secteur de la Rive Gauche. The first generating stations were put down within the town limits. A number of these are still working; but others have been replaced by stations built outside the fortifications, thus increasing largely the amount the Companies have to provide for sinking fund.

The financial results from the point of view of the Companies, the public, and the town, are set forth by our contemporary, and may be summarized for our columns.

The "Campagnie Continentale Edison" have a nominal capital of 10 million francs (£400,000). The gross receipts in 1896 and 1903 were 3,672,000 frs. and 5,378,000 frs. respectively (£146,880 and £215,000); the working profits in the latter year being 3,209,000 frs. (£128,360). The Company have already allocated 2 million francs (£80,000) towards the sinking fund; while the amount paid to the shareholders equals 950,000 frs. (£38,000). They supply 4750 subscribers, who have 2270 arc lamps and 219,000 incandescent lamps in use.

The "Compagnie Parisienne de l'Air Comprimé" supply 49 arc lamps and 238,000 incandescent lamps to 4840 subscribers. The first cost of their installation was 63 million francs (£2,520,000), of which they had redeemed about 16 million francs (£640,000) up to June of last year. The gross annual receipts amounted to about 6,700,000 frs. (£268,000), out of which they paid the Municipality a royalty of 355,000 frs. (£14,200). The net annual receipts, including those made by the distribution of compressed air, amounted to about 5,130,000 frs. (£205,200), which, it is said, the Company now utilize exclusively for their sinking fund.

The "Société d'Eclairage et de Force" have 3200 subscribers, using 5239 arc lamps and 107,000 incandescent lamps. Out of their gross annual receipts of 3,014,000 frs. (£120,560), the Municipality receive 161,000 frs. (£6440). No less than 9,550,000 frs. of the Company's nominal capital of 10 million francs (£400,000) has been redeemed. The Company's net receipts, according to the last balance-sheet, were 1,766,000 frs. (£71,040).

The "Société du Secteur de Clichy" have 8000 customers, using 1300 arc lamps and 245,000 incandescent lamps. They pay to the Municipality an annual royalty of 246,000 frs. (£9840) out of the gross annual receipts of about 4,196,000 frs. (£167,840). Up to the date of the last accounts, 3,400,000 frs. (£136,000) had been paid off the original capital of 15 million francs (£600,000). The sinking fund amounts to a total of 6 million francs (£240,000). The Company's net annual receipts are now about 3,300,000 frs. (£132,000), 2 million francs (£80,000) of which is paid to the sinking fund for depreciation and upkeep of plant, leaving the sum of about 540,000 frs. (£21,600) for distribution among the shareholders.

The "Société du Secteur des Champs Elysées" have a capital of 5 million francs (£200,000); the subscribers being 8600 in number, who have 876 arc lamps and 360,000 incandescent lamps. From the gross annual receipts of about 3,880,000 frs. (£155,000), the Municipality receive as royalty 250,000 frs. (£10,000). To the sinking fund is allocated 1,500,000 frs. (£60,000), and 500,000 frs. (£20,000) goes in the payment of dividends.

The "Société du Secteur de la Rive Gauche" have 5000 subscribers, who employ 1527 arc lamps and 179,000 incandescent lamps. With a capital of 12 million francs in bonds and 9 million francs in shares (£840,000 in all), the Company secured gross annual receipts of about 3,400,000 frs. (£136,000), and net annual receipts about 1,750,000 frs. (£70,000). Interest on the bonds absorbs 530,000 frs. (£21,200); but it is said that "no remuneration is paid to the shareholders." The Municipality, however, under the concession, receive a royalty of 200,000 frs. (£8000).

Concluding their interesting article, "Engineering" says: The public and the promoters who placed their money in the undertakings have hitherto received but little, if any, remuneration; and the comparatively short time allowed for the concessions has compelled the Companies to take, where these were possible, energetic means to provide for redeeming their plant, thereby charging the public high rates for their current supply. If the Municipality, when the concessions lapse and are not renewed, do not take over the installations made by the companies, the latter will have great difficulty in getting rid of them. [The Municipality only undertook to purchase the installations should they take over a concession previous to its lapsing.] This, however, is an eventuality which is little to be feared, according to the opinions of outside experts, seeing that the Paris authorities are now more than ever bent on municipalization, notwithstanding the fact that, as regards electric current distribution, the Halles Central station, briefly alluded to above, and worked by the Municipality, has given, we are told, very poor results. The Municipality may demand, when the concessions lapse, that the installations be worked *en régie*, entirely under their control; but this might lead to a deadlock, as the Companies, we believe, can refuse absolutely to give their sanction. The only reasonable way would be to grant the Companies a new lease to enable them to redeem their plant without having recourse to exaggerated measures, and, as a consequence, to lower the price at which they sell their current.

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	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily
BLACKBURN	1,250,000	ST. CATHERINES (Remodelled)	250,000	TONBRIDGE	300,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont.)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.

AND, IN ADDITION, 8,150,000 CUBIC FEET DAILY; also Coal-Gas Plants at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Notwithstanding the decision of the Court of Session last year in the question of the valuation of the undertaking of the Kirkcaldy Gaslight Company, and the paper dealing with the assessable value of gas-works, read by Mr. A. Yuill, of Dundee, at the meeting of the North British Association of Gas Managers last July, I have been able to find only two cases in which appeals by Gas Companies have been taken to the Valuation Courts. One of these was raised by the Bellshill Gas Company, who asked that the valuation of their works should be reduced from £1153 to £1113. It was stated that the Assessor had refused to allow deductions in respect of the fees paid to the Directors during the year, and in respect of interest paid upon borrowed money. Both those outlays, it was pointed out, were allowed by the Kirkcaldy decision to be deducted. After discussion the Court allowed the Directors' fees to be deducted, but refused to allow any deduction in respect of interest, and they reduced the valuation to £1123. The other case was brought by the Macduff Gas Company, a very small concern, who objected to the raising of the valuation of their undertaking to £80. and asked that it be retained at £40, at which it was fixed about thirty years ago. The decisions in the Falkirk case of 1883 and in the Kirkcaldy case were cited in support of the appeal; and it was contended that an assessment of £80 left £24 only for tenant's profits, which was too small an allowance for a tenant. The Assessor explained that he found the total profits of the Company for the past year to have been £152. Deducting £30, being 5 per cent. on a tenant's capital of £600, and allowing £24 for tenant's profits, he brought out a valuation of £98. He therefore thought that his valuation was a fair and equitable one. The Court fixed the valuation at £70.

On Monday, the Town Council of Perth had a conversation relating to the valuation of properties belonging to the city. It arose through Mr. Macpherson challenging the accuracy of a minute of the Gas Committee, in which it was stated that the Committee remitted to the Convener of the Committee, and to Mr. W. B. M'Lusky, the Gas Manager, and another, to meet with the Parish Council and endeavour to get a reduction upon the rates, under section 37 of the Poor Law (Scotland) Act, 1845. Mr. Cuthbert, the Convener of the Gas Committee, pointed out that a legal question was involved, and that, in his opinion, it should not be discussed by the Council. If a principle were adopted in connection with the assessment of the gas undertaking, it would lead to a proper understanding with regard to the other departments. The objection of Mr. Macpherson was to the Gas Committee being allowed to settle the matter for the whole of the town. He asked that the matter be sent back to the Gas Committee, in order that the other Committees interested might be consulted. The approval of the minute was adopted by eight votes to three.

The Auditor of the City accounts has compiled a report upon them, and forwarded it to the Town Clerk, who read it at a special meeting of the Town Council held last Thursday. In his report, the Auditor makes a number of strictures upon items of expenditure, and, in some instances, financial arrangements. In connection with the gas accounts, he states that the amount expended on gas-stoves is to be written off out of revenue by instalments extending over twenty years. It is also proposed that an erroneous debt of £2521 in that account be written oft in ten years; but as he finds that the meters of consumers of gas are not always taken up to May 15, the date of balance, and the gas consumed between the date of the last meter takings and the date of the balance has never been allowed for in the accounts, he ventures to suggest that an estimate of the accrued consumption should be hereafter taken credit for, and that, at the outset, it be utilized *pro tanto* to wipe out the entry of £2521, the liquidation of any balance being spread over a series of years. Out of the original annuities of £2821 10s., valued at £90,000, granted by the city to the shareholders of the old Gas Company in payment of the price of the undertaking, there still remain outstanding annuities of £2377, valued at £76,268; and during the currency of the present audit his attention had been called to a proposal which was in view, of having the annuities redeemed as early as possible by obtaining statutory powers of compulsory purchase. The Council remitted the report to the Finance Committee.

At the Denny Town Council on Tuesday, Mr. Scott, the Convener of the Gas Committee, stated that since their last meeting, at the request of the Council, he and the Gas Manager—Mr. J. M'Donald—had visited Coatbridge Gas-Works, where they were most cordially received by Mr. Wilson, and were shown all round the place. With regard to benzol enrichment, he thought they might consider the advisability of introducing it. Mr. Wilson was very clear as to the advantages to be derived from it, and he reckoned the outlay for a place like Denny at about £60. Provost Hunter expressed the indebtedness of the Council to Mr. Scott for his report. He thought the matter should be considered by the Committee.

Bailie Thomson, the Convener of the Finance Committee, at the meeting of the Arbroath Town Council on Monday, presented the annual accounts of the burgh. Dealing with the gas accounts, he said they had had a very favourable year indeed. During the year ending May 15 last, the price of gas was reduced to 5d. less than it was the previous year—from 3s. 6½d. to 3s. 1½d; and notwithstanding this reduction, they had managed not only to hold their own, but to make what amounted to a considerable profit. The reduction in the price of gas had, of course, led to a reduction in the gas revenue; the sum received for the year ending May 15 having been about £900 less than in the previous year. This had not arisen from a less consumption of gas, because they would find that 3¾ million cubic feet of gas more were sold than in the previous year, which represented a further saving to the community of considerably over £500—the total saving being thus £1500. They would also see that for their residual products they received upwards of £600 more than the previous year. After paying all their working expenses, and paying out of current revenue the sum of £553 in respect of law expenses for electric lighting, and after spending £550 on sulphate plant and retort-bench renewal, they

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carried a balance to the net revenue account of £4087, which they had applied in payment of gas annuities and interest on loans, the payment to the Arbroath Harbour Trustees of £275, the large contribution of £575 to the sinking fund, and the carrying to the contingency and depreciation account of no less a sum than £925. He would also point out that, notwithstanding the very extensive additions and improvements which had been effected at the gas-works during the last three years, costing about £6500, not one penny had been added to capital account. These improvements had been paid through the operation of the suspense account. Out of the suspense account, the remainder of the expenses of the Electric Lighting Provisional Order, amounting to £586, had been paid. The whole cost of the Order had been £1140, and all of it had been paid out of the gas current revenue or the gas suspense account. He did not need to remind them that, for the year now begun, the price of gas to ordinary consumers was to be reduced by 2½d. per 1000 cubic feet, making it 2s. 11d., and that for prepayment meters the reduction was 5d. per 1000 cubic feet. When they bore these figures in mind, they must be convinced that the gas-works, and the gas finances, were on the proper lines. The Gas Committee recommended, for the reasons I stated last week, that no increase of wages be given to the gas stokers. Mr. Aitken moved that the subject be sent back to the Committee for further consideration. The motion was, however, lost by 15 votes to three. It was reported that the Assessor had placed a valuation upon the gas-works and gas-pipes in the burgh of £3170, as compared with £2505 last year, and that the Gas Committee, after consideration, had resolved that the increased valuation be acquiesced in. Bailie Thomson said that the gas-works had been so successful of late, and so much plant had been added in new gas-pipes, that the Council could not demur to the increased valuation. The Council approved.

The Gas Committee of the Hamilton Town Council reported to the Council on Monday that 1½ million cubic feet of gas was consumed annually outside the burgh boundaries, half of which was taken by three customers. The charge for gas so supplied was 5d. per 1000 cubic feet above the price within the burgh. The Gas Manager—Mr. J. Ballantyne—recommended that the extra charge be abolished; and the Committee approved. In the Council, in reply to a question, Bailie Hamilton, the Convener of the Committee, said that the loss which the Corporation would sustain would be about £36 a year. Mr. Smellie moved that the matter be sent back to the Committee. They had had, he said, no argument in support of the proposal. The Corporation of Glasgow charged a higher rate for gas and water supplied outside the city. Mr. Robertson thought that if they remitted the 5d. to the outside consumers, they would have to consider the consumers who used prepayment gas-meters, who were also charged 5d. extra. Provost Keith thought the matter should be sent back to the Committee for fuller information. He understood that some of the outside consumers were willing to give an assurance that they would take the burgh gas, and he thought the Council should have some idea as to the length of time the gas would be used. This course was ultimately agreed to.

CURRENT SALES OF GAS PRODUCTS.

Week ending Sept. 16.

The London market for tar products still remains in rather a quiet condition. The best price at which business can be done in pitch is about 28s. 6d. net at makers' works. Benzol is very firm; 9¾d. to 10d. net being obtainable for 90's. 60's crude carbolic acid is also in good demand; buyers offering 1s. 8d. net, while sellers ask a little more. Sulphate of ammonia is in a strong position, and the price on Beckton terms has been advanced to £12 13s. 9d. The South Metropolitan Gas Company, being well sold, are not quoting at present.

LIVERPOOL, *Sept.* 16.

Sulphate of Ammonia.

Demand has been well sustained, especially in Scotland, and there has been a slight improvement in values all round; the closing prices being £12 7s. 6d. per ton f.o.b. Hull, and £12 11s. 3d. to £12 12s. 6d. per ton f.o.b. Liverpool and Leith. Quite exceptional demand for Japan continues to be the most important factor in the situation; but Colonial requirements have also been large. Shipments to the Continent and to Spain have been mainly on contracts made in advance. There continues to be some inquiry in the forward position; but makers' views are still above the ideas of buyers, and not much actual business has transpired.

Nitrate of Soda.

This article is steady on spot at 10s. 3d. to 10s. 9d. per cwt., according to quality; while ordinary quality for spring delivery is being quoted 10s. 3d. per cwt.

LONDON, *Sept.* 16.

Tar Products.

Markets have been quiet during the past week; but as a rule prices have been fairly well maintained. In carbolic acid, sales are reported at 1s. 8¼d. and 1s. 8½d. for September-October delivery, but manufacturers decline to sell to the end of the year at under 1s. 9d.; while consumers are only offering 1s. 8d. for this delivery. In crystals, a fair business is reported to have been done at 6 1/16d. for 39-40 per cent. by Foreign makers; but the English producers as a rule ask 6⅛d. to 6¼d., and are not anxious sellers. Benzol, 90 per cent., continues in very fair demand, and there is scarcely any offering for early delivery. London makers appear fully sold for September, and are asking 10d. for October. Consumers, however, are not at present inclined to pay this price; while business is reported in the North at 9½d. to 9¾d. for September. In 50-90 per cent., there does not appear to be anything doing at present, and English consumers decline to pay the price asked by manufacturers. Prices are very well maintained in toluol, and there is a strong demand for both prompt and forward delivery. Makers, however, decline to sell forward except at an increase in value. In creosote, the largest London producers are still firm at 1¾d.; but salty

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oil could be bought from the smaller distillers at under this price. In Yorkshire, considerable business is reported at prices varying from 1½d. to 1⅝d. per gallon according to quality and place of delivery. In solvent naphtha, the demand continues very strong both for ordinary 90 per cent. at 160°, and also for the special heavy qualities with a high flashing point. London makers appear well sold for delivery over the present year; but business is reported in the North at 9d. for prompt. There is still a good inquiry for delivery over next year; but manufacturers decline to entertain business, except at an improvement on existing prices. There is nothing fresh to advise in pitch. The South Wales consumers are still open to purchase for delivery all over next year, but dealers are not prepared to contract except at an improvement on existing values. London makers maintain their price; and so far as the Yorkshire producers are concerned, they appear to be well sold for early delivery, and are not desirous of contracting forward until some of the larger tar contracts have been settled.

The average values during the week were: Tar, 16s. to 21s. Pitch, London, 28s. 6d. to 29s.; east coast, 28s. to 28s. 6d.; west coast, 25s. 6d. to 26s. Benzol, 90 per cent., 9½d. to 10d.; 50-90 per cent., 9d. to 9¼d. Toluol, 9¼d. to 9½d. Crude naphtha, 3⅛d. to 3⅜d.; solvent naphtha, 9d. to 9¼d.; heavy naphtha, 10d. to 10⅛d. Creosote, London, 1⅞d. to 1¾d.; North, 1½d. to 1⅝d. Heavy oils, 2d. to 2 1/16d. Carbolic acid, 60 per cent., 1s. 8d. to 1s. 8½d. Refined naphthalene, £4 10s. to £8 10s.; salts, 14s. to 16s. Anthracene, "A" quality, 1½d. to 1⅝d.; "B" quality, unsaleable.

Sulphate of Ammonia.

The market for this article has been distinctly firmer during the week, and closes with an upward tendency. Beckton have advanced their price from £12 12s. 6d. to £12 13s. 9d.; while the South Metropolitan Company now report that they are so fully sold as to be practically out of the market. In Leith, makers report a very strong demand during the entire week, and have declined £12 12s. 6d, and now ask from £12 13s. 9d. to £12 15s. They report that business has been done at £12 15s. for the early months of next year, while they ask £12 12s. 6d. for April-September. There is very little offering at Hull; but I understand that business has been done at £12 8s. 9d. for a small parcel for prompt delivery. Liverpool is firm at £12 10s.

Leakage at Pontypridd.—On the annual report of the Gas Manager (Mr. E. Jones) being presented to the Pontypridd Urban District Council, Mr. Edwards called attention to the fact that there had been a leakage of 28 million cubic feet, which was equal to a loss of over £4000 per annum. Mr. Jones pointed out, however, that the calculation of loss should be made at works cost; and Mr. Edwards said in that case the amount would be some £2500. Mr. Thomas remarked that the leakage could be largely accounted for by subsidences that had occurred; and Mr. Jones added that the leakage in a colliery district varied from 12 up to 40 per cent. Then, again, when relaying mains recently, a considerable amount of gas went to waste.

COAL TRADE REPORTS.

Lancashire Coal Trade.

The demand for house coal is gradually increasing, which is attributable to the general fall in the temperature. More engine and boiler fuel is also being supplied to users. Full time at the pits is being worked in various parts of the mining districts. A slight increase is also noticeable in the requirements of shipping on the Manchester Canal. Owing to the shortening days, gas coal and cannel is being delivered on existing contracts. Prices, however, remain about the same for all descriptions. An effort is being made to form a company with the object of re-opening Coney Green pits, which were closed five years ago after a wages dispute. There is a good bed of excellent coal in the vicinity. There is also a proposal to re-open another pit near Elton. If these schemes are carried out, work will be found for about 400 men.

Northern Coal Trade.

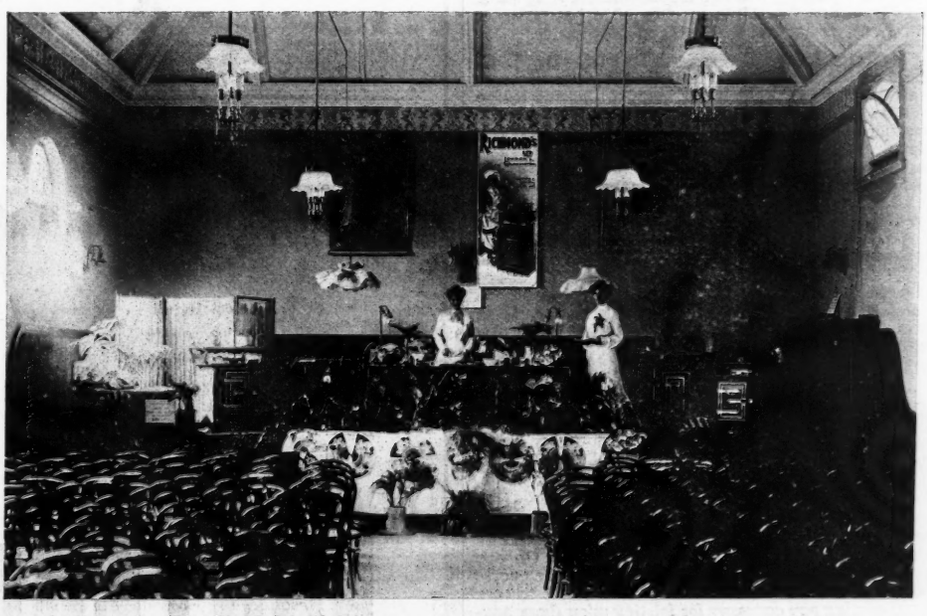
There is a steadier tone in the Durham coal trade, and the shipments are showing a very satisfactory increase; while in the Northumbrian branch of the trade, there is a fair inquiry for this season. In steam coals, best qualities are from 9s. 1½d. to 9s. 3d. per ton f.o.b., second-class steams are from 8s. 3d. to 8s. 6d., and steam smalls are steady at from 4s. 10½d. to 5s. 6d. In gas coals, the demand increases, more especially on long contracts; and the current quotation for occasional cargoes is from 7s. 10½d. to 8s. 6d. per ton, though a higher price is at times asked. One or two contracts are now being negotiated; and for an Italian port, a quantity has been sold at about 8s. 3d. per ton—f.o.b., it is said, but much depends on the allowance that is made for freight, &c. Coke is very firm, with a good export. Gas coke is still irregular; and the increase of the production tends to enlarge this condition. Prices vary even more than our last quotation.

Scotch Coal Trade.

There is a little more activity in the trade, which, however, is only what is looked for at this season; but the improvement is not sufficient to affect prices. Perhaps the most hopeful feature of the market is the improvement in the iron trade. The prices quoted are: Main 7s. 3d. to 7s. 6d. per ton f.o.b. Glasgow, ell 8s. to 9s., and splint 8s. 6d. to 9s. The shipments for the week amounted to 254,864 tons—an increase of 11,830 tons upon the previous week, but a decrease of 1425 tons upon the corresponding week of last year. For the year to date, the total shipments have been 8,347,260 tons—an increase of 437,947 tons upon the same period of 1904.

Reduction in Price at East Ham.—At the meeting of the East Ham Urban District Council on Tuesday, a letter was received from the West Ham Gas Company stating that, as from last quarter's account, the charge for gas will be reduced from 2s. 11d. to 2s. 10d. per 1000 cubic feet; and that in the case of public lighting this charge, as at present, will be subject to a discount of 6 per cent.

COLONIAL COOKERY.



RICHMOND'S IN SOUTH AFRICA.

ADVERTISEMENT OF THE RICHMOND GAS STOVE & METER CO., LTD. LONDON: 132, QUEEN VICTORIA STREET, E.C. WORKS & OFFICES: WARRINGTON & STRATFORD.

The Expenditure on the Rhyl Water-Works.—The Rhyl Urban District Council have adopted a recommendation of the Water Committee, that the Local Government Board should be advised that the cost of the new reservoir would exceed the amount already sanctioned by from £700 to £900, and that an application for a further loan would be made directly. The expenditure on the work has already reached £24,943. When the matter was under consideration, Mr. Ellis said he was sorry it would be necessary to again borrow for the purposes of the new reservoir. They went fully into the matter before applying for £7000 recently, and were given to understand that this sum would complete the work. Mr. L. G. Hall, the Water Engineer, explained that they had had to excavate much deeper than was anticipated. Had the rock inclined upwards instead of down, there would have been a saving on the estimate; but as it was they had had to spend more.

Ossett and the Electric Light.—The discussion of a proposed electric lighting scheme, estimated to cost £8400, led to a disorderly scene in the Ossett Town Council last week. At the ordinary meeting on Monday, the standing orders were suspended; and Mr. Taylor moved that the scheme be abandoned, and the Board of Trade asked to extend the time allowed for putting the Electric Lighting Order into force. But an amendment being carried, that the Council stand adjourned, the meeting was brought to an abrupt end. The discussion was resumed on Thursday, when an effort was made to get the proceedings still further adjourned. The Mayor, on refusing to allow this to be put to the meeting, as an amendment to Mr. Taylor's motion, was subjected to an extraordinary attack; and when the vote was taken on the resolution, it resulted in a tie. The Mayor thereupon gave his casting vote in favour of the abandonment of the scheme. One of the members stated that if it was possible to upset the vote it would be done.

Wages of Plumbers at Birkenhead.—With regard to a point raised by the Trades Federation as to the rate of wages paid to plumbers casually employed, the Birkenhead Gas and Water Committee reported at the last meeting of the Town Council that they saw no occasion to make any change in the existing practice of paying less for casual than for permanent labour. An amendment that the matter should be further considered was moved and seconded, but rejected by the Council. One member argued that the Committee often competed with ordinary tradesmen, and ought to pay the same rate of wages that the latter had to do. Alderman Bloor, however, replied that the Committee had considered the matter very fully on two occasions, and came to a unanimous conclusion. There had never been a practice in the Corporation service to pay absolutely the same rate of wages as that current with private traders; and there was so little work done by casual men that the Committee did not think it necessary to make any change.

Charge of Extinguishing a Public Lamp.—A Colonel's son was summoned at Seaton, Devonshire, on Tuesday, for extinguishing a public lamp. Mr. Marsh, for the defence, said he had a legal objection to offer to the summons. It was taken out under a clause of the Act which made it an offence for anyone to extinguish a public light "wilfully, wantonly, and to the annoyance of passengers." The summons merely stated that the defendant extinguished a light, and did not charge him with being on the highway, or with doing it to the annoyance of passengers. The Magistrates could only convict with regard to what was on the summons; and he contended that the wording of the summons did not charge his client with an offence at all. He was authorized to express Mr. Satterthwaite's regret for what had been done; but he thought it was no good to take the evidence, as they would be unable to convict. Mr. Evans, for the prosecution, said he could prove that the extinguishing was to the annoyance of the public. Mr. Marsh: That does not matter. It is not charged in the summons. The Bench agreed that the summons was bad, and dismissed it.

Quality of the Water in the Chelmsford District.—Dr. J. C. Thresh has reported to the Chelmsford Rural District Council a case of lead poisoning at Galleywood, which was found to be due to the water, and said he suspected other persons were now suffering in the same way. The water yielded by much of the Galleywood gravel was of an unusual character, since it acted powerfully on lead piping. The water implicated could dissolve as much as 8 grains of lead per gallon in 12 hours; and he suggested that all lead fittings should be removed and iron substituted, though he did not know whether the Council had power to enforce this. He also said he had examined a sample of the water from the reservoir at Writtle, after it had passed through the filters. It was markedly turbid; and the turbidity was due to chalk and very fine sand or clay, which refused to settle, and could not be removed by the filters. This was quite harmless; but he regretted to say the water contained an excessive amount of organic matter, which was not present in that taken from the bore-tube during the earlier stages. This was certainly most unsatisfactory; and until the cause of the pollution was found and removed, the water should not be laid on to the houses.

Quality of the Gas Supply at Fratton.—At last week's meeting of the Portsmouth Town Council, the Finance Committee recommended that Messrs. Bishop and Moncreaff should see the Gas Company with regard to the alleged presence in the gas supplied to the Fratton district of large quantities of sulphuretted hydrogen. The former gentleman stated that the Company were most anxious to meet the Council. What had occurred in the past was dangerous; but he believed it would not happen again. Mr. Murtough said he did not remember ever reading a charge so damning against a public company. On one side of the town the gas was good; on the other side, where the poorer classes lived, it was bad and dangerous. The Council ought to seek for the power of prosecuting any company for foisting upon them anything detrimental to the health of the people. Mr. Main moved, as an amendment, that the tests should be made regularly in future, and reported to the Council and the Gas Company. Mr. Palin suggested that it would be desirable to have two more testing-stations. If gas of two qualities was being dispersed in the town, it was a most serious matter. Mr. Bishop remarked that testing went on in the town nearly every day, and that the Gas Company said they were not aware of the bad quality of the gas. The amendment was carried.

PARKINSON'S

"HEALTH"

GAS-FIRE.

No. 40

LANTERN.

WRITE—

PARKINSON AND W. & B. COWAN, LTD.

(PARKINSON BRANCH),

COTTAGE LANE, CITY ROAD, LONDON. | BELL BARN ROAD, BIRMINGHAM.

Improved Gas Lighting at Deptford.—The Deptford Borough Council have decided, in accordance with a principle already approved of reducing the space between the street-lamps to a distance not exceeding 50 yards, to place 36 new lamps and columns in certain positions in eighteen streets, at an estimated cost of £118, and to refix 41 existing lamps in improved positions at a calculated outlay of £25.

Sulphur in Wandsworth Gas.—At the meeting of Wandsworth Borough Council last Wednesday, the Gas Examiner reported that on Aug. 21 his testings showed 33·5 grains of sulphur per 100 cubic feet in the gas supplied by the Wandsworth and Putney Gas Company. The Act provided that the sulphur must not exceed 20 grains per 100 cubic feet, but no penalty was incurred unless the excess amounted to 2 grains upon the average of six consecutive week-days, or 10 grains upon any one day. The Company had written stating that the excess referred to was entirely due to an unforeseen accident to a joint by which air was admitted to the gas; and that within a few hours after the defect had been noticed, the purifiers were working properly. Under the circumstances, no order was made.

Blackburn Town Council and their Gas-Fitters.—Some months since, the local plumbers called the attention of the Blackburn Corporation to the fact that they were not paying the plumbers in the Gas Department the standard rate of wages, and so were not carrying out the terms of their own contract clause. The matter was referred to the Sub-Committee, who recommended that any new men given employment in fitting meters, gas-stoves, &c., must be practical plumbers, and be paid the standard rate. The Council agreed to this; and thereupon the assistant fitters sent a deputation to the Gas Committee, complaining that they were thus debarred from being promoted to fitters. The Committee, after considering the matter, asked the Council to rescind the resolution previously come to; and this they have since done.

Birkenhead Gas-Works Extension Scheme.—After a lengthy discussion, the Birkenhead Town Council have referred back for further consideration a recommendation of a Special Sub-Committee that application should be made to the Local Government Board for sanction to the borrowing by the Council of the sum of £50,000, the estimated cost of proposed additions and extensions of the gas-works. In consequence of this decision, a second resolution dealing with the same matter was withdrawn. This resolution was to the effect that the Council be recommended to apply to Parliament in the next session for a Bill empowering the Corporation to acquire some property situate at Bromborough, and containing about 40 acres, and to utilize the same or some part thereof as a site for the manufacture of gas and residual products in connection with the extension of the existing gas works.

Prosperity of the Wexford Gas Company.—In calling attention to a statement that the profits of the Limerick Corporation Gas-Works for the past year show a falling off, a Wexford paper says that, as a contrast, it may be of interest, now that the gas question is so often before the Council, to give an idea of how the local gas-works compare with those of Limerick. In the latter place the annual consumption of gas is something like 120 million cubic feet; in Wexford it is about one-third—40 million feet. The price of gas in Limerick for lighting purposes is 3s. 3½d. per 1000 feet, and for engines 3s. 2½d. In Wexford the price for lighting is only 2s. 9d. per 1000 feet, and for engines 2s. 6d. The profits at Limerick last year were about £400; while those of the Wexford Company were considerably over £2000. "From these facts and figures," it is added, "it will readily be seen that the Wexford Gas Company, who sell the cheapest gas in Ireland with the sole exception of Belfast, are most generous to their consumers, and at the same time in a very prosperous condition."

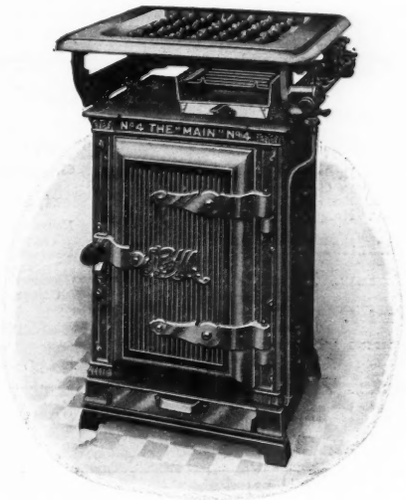
Falmouth Gas Company.—Presiding at the annual meeting of this Company recently, Mr. John Mead said that during the last twelve months the output of gas had increased by 2½ million cubic feet. The Company was incorporated fifteen years ago, and during this time the output had been all but doubled. This was a fairly satisfactory result. Five per cent. per annum was considered to be a very good increase in output; but statistics gave their Company a little more than 6 per cent., taking the whole course of fifteen years. Such a state of things be regarded as a cause for congratulation. Referring to the change of Engineer and Manager during the year, he said the Company had achieved very satisfactory results from the work of Mr. J. W. Buckley, who was a capable man, and from whose brains they had derived a great deal of benefit. It was only to be expected that a Manager of Mr. Buckley's ability would seek promotion; and they congratulated him upon the superior appointment he had secured at Devonport. In Mr. H. H. Hoare, of Taunton, the Company secured a successor of whom they thought very highly. An interim dividend of 5 per cent. for the half year to Dec. 30 was paid; and the Directors now recommended the declaration of a further dividend of 5 per cent. for the six months to June 30 (less income-tax)—placing 1 per cent., the balance of the statutory dividend, to the reserve fund.

A Plea for the Southport Gas Workers.—At the meeting of the Southport Town Council last Tuesday, Alderman Travis moved the adoption of the minutes of the Gas Committee, including a resolution to increase the salary of Mr. R. Walmsley, the Assistant Gas Manager, from £200 to £220, and that of Mr. J. E. Blundell, Draughtsman and Chemist, from £130 to £150 per annum. He remarked that the Committee were highly pleased with the services of their officers, and they wished to retain them. Mr. Booth opposed the motion, on the ground that they were continuously and consistently rising the salaries of the officers, but they seldom increased the wages of, or gave any praise or credit to, the workmen. The last time the workmen had any consideration was when they actually took one or two days' holiday from them. He believed they formerly had six days' holiday, and this was reduced to four, which he considered a shabby thing for the Council to do. It was a fact that the men on the gas-works did not dare to speak to a councillor, and make any grievance known; but though they had not been to him, he knew very much about their complaints. They were making vast profits every year, and gave the credit to the officials. Surely something must be said for labour. The circumstances of Southport made it necessary that they should give the best of wages. The resolution for the increases, on being put to the vote, was carried almost unanimously; Mr. Booth voting against it.

The "MAIN"

Gas

Cooker



RELIABLE AND UP-TO-DATE.

PROMPT DELIVERY.

R. & A. MAIN, LIMITED,

LONDON, GLASGOW, FALKIRK, BRISTOL, MANCHESTER

BIRMINGHAM, AND BELFAST.

A Bogus Gas Inspector at Ipswich.—At the Ipswich Police Court, last week, an engine driver named Ladbrook was sentenced to two months' hard labour in four cases of stealing money from automatic gas-meters, the sentences to run consecutively. He gained access to the meters by stating to the houseowners that he called on behalf of the Gas Company to inspect them, "because there had been so many leaden coins in them of late." It was mentioned in Court that there had been many other complaints of similar robberies.

A Medical Officer of Health on Mond Gas.—In connection with the granting of permission by the Wolverhampton Town Council to the South Staffordshire Mond Gas Company to lay various branch mains, subject to the work meeting with the approval of the Borough Engineer, the following letter was read from Dr. Malet, the Medical Officer of Health: "I do not know the composition of this gas; but I am informed that, like water gas, it contains a considerable portion of carbonic oxide. If this is so, the laying of mains cannot be too carefully guarded. Carbonic oxide is an active poison, very detrimental to health, if breathed in constant (even if small) quantities. It is the actively poisonous principle in coal gas, in which, however, it is only present in a small proportion. If the Mond gas is comparatively odourless, the risk would be increased."

Shortcomings of Electricity at Taunton.—In moving that a resolution to borrow £5000 for the purposes of the Taunton electricity undertaking be rescinded, Mr. Standfast, a member of the Town Council, said his object in doing so was to endeavour to have the electric light business conducted on honest business principles. To do so, he felt it was time to expose some of its deceptions. They would remember that they took £1700 out of the rates. This had not all been paid back; and when the renewals came on, the Committee always borrowed for them. Therefore a sufficient sum should be charged to meet these renewals. They said they wanted more plant; and it meant 8 per cent. to go for interest and depreciation, which was another £500 a year. Where was this to come from? If they looked at the street lighting, everybody was complaining. They had 72 arc lamps at £20 each, which came to £1440. They had taken from the ratepayers altogether £2097 for arc and incandescent lamps; and by doing away with the arc lamps, and lighting the main streets with incandescent gas, £1000 a year could be saved, and that part of the town be very much better lighted. The motion was lost.

Sale of Ipswich Gas Stock.—Last Thursday, at Ipswich, Messrs. Garrod, Turner, and Son offered for sale by auction £3000 of new "C" stock in the Ipswich Gas Company. This stock is now receiving a dividend at the rate of 10 per cent. per annum. It was put up in lots of £10, 173 of which sold at £22 10s. each, and 127 at £22 12s. 6d. The total amount received was £6765 17s. 6d.

The Keith Light by Night.—A beautiful set of photographic illustrations is comprised in a pamphlet that the James Keith and Blackman Company, Limited, are about to issue. Their subject is the Keith high-pressure light; and they show (the photographs having been taken at night time) the effect of the system in street, church, market, shop, and factory lighting. There are nearly three dozen half-plate pictures; and in every case the name of the establishment the lighting of which is illustrated is appended to the picture—not one of which has been in any way the subject of the photographer's "touching-up" art. This is the type of pamphlet to distribute among town councillors and large users of gas and electric lighting.

One of the recommendations of the Keighley Gas Committee to the Town Council is that an annual subscription of £50 be made to the funds of the Keighley Hospital Committee from the profits of the gas-works, on the understanding that the Corporation be suitably represented upon the Hospital Committee. The gross profits of the Gas Department for the year ended June 30 amounted to £17,250; and it is proposed to allocate £6002 of this sum for the relief of the rates.

With regard to the paragraph in last week's "JOURNAL" (p. 706) on the subject of the recent visit of Mr. Child, the "water finder," to Bungay, we are informed it is not the fact that through his agency water has been discovered in several places. Mr. Child indicated several spots where he thought water would be found, and well-sinking is in operation at one of them. The spot indicated is practically on the river-side, and about 20 to 25 feet above the river—the Waveney—which runs nearly all round Bungay; and as the subsoil is sand and gravel, the find is not a very wonderful one. Indeed, it is asserted that water can be reached anywhere in Bungay at a depth of from 25 to 30 feet. The difficulty there is not to find it, but to get it good; the water in many wells being saturated with iron, and perfectly useless for potable purposes.

WANTED, FOR SALE, CONTRACT, &c. ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

METER-MAKER. Derby Gaslight and Coke Company.
WORKING-FOREMAN GAS-FITTER. No. 4463.
DRAUGHTSMAN. No. 4466.
DRAUGHTSMAN. No. 4467.

Situations Wanted.

WORKING FOREMAN. G. Watson, Torquay.

Agencies Wanted.

GAS ENGINEERING AND MANUFACTURING COMPANIES. No. 4462.

Premises To Let.

66, FARRINGDON STREET.

Plant, &c., for Sale.

HYDRAULIC MAIN, DIP-PIPES, BRIDGE-PIPES, W. AND P. VALVES. Maldon Gas Works.
STATION GOVERNOR, LAMP COLUMN. Henley-on-Thames Gas Company.
CORNISH BOILER. Bournemouth Gas and Water Company.

Incandescent Mantles Wanted.

BRUNT, BRISTOL.

Company Meeting.

BRITISH GASLIGHT COMPANY. London Offices, Sept. 27. Twelve o'clock.

TENDERS FOR

Coke.

WANDSWORTH AND PUTNEY GAS COMPANY. Tenders by Sept. 22.
ISLE OF THANET GAS COMPANY. Tenders by Sept. 21.

Tar and Liquor.

ASHFORD GAS DEPARTMENT. Tenders by Oct. 5.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 738.

Issue.	Share.	When Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
560,000	10	Apl. 13	10½	Alliance & Dublin 10 p.c.	21½—22½	..	4 13 4
160,000	10	,,	7½	Do. 7 p.c.	14½—15½	..	4 16 9
200,000	5	May 12	6½	Bombay, Ltd.	6¾—7	..	4 12 10
140,000	5	,,	6½	Do. New, £4 paid	5—5¾	..	4 14 6
50,000	10	Aug. 31	14	Bourne- } 10 p.c.	29—30	..	4 13 4
251,810	10	,,	7	mouth Gas } B 7 p.c.	16½—17½	..	4 0 0
53,200	10	,,	6	and Water } Pref. 6 p.c.	15½—16½	..	3 12 9
380,000	Stk.	Aug. 16	12½	Brentford Consolidated	250—255	..	4 18 1
300,000	,,	,,	5½	Do. New	190—195	..	4 17 5
50,000	,,	,,	5	Do. 5 p.c. Pref.	125—130	..	3 16 11
206,250	,,	June 15	4	Do. 4 p.c. Deb.	103—106	..	3 15 6
220,000	Stk.	Sept. 15	11½	Brighton & Hove Orig.	220—223*	..	5 0 0
246,320	,,	,,	8½	Do. A. Ord. Stk.	160—165*	..	5 0 0
400,000	20	Mch. 30	10	British	43—44	..	4 10 11
100,600	Stk.	Aug. 16	6	Bromley, Ord. 5 p.c.	119—123	..	4 17 7
165,700	,,	,,	4½	Do. do. 3½ p.c.	89—93	..	4 16 9
500,000	10	May 12	7	Buenos Ayres (New) Ltd	12½—13	..	5 7 8
250,000	Stk.	June 29	4	Do. 4 p.c. Deb.	9 —98	..	4 1 8
150,000	20	July 13	8¼	Cagliari, Ltd.	24—26	..	6 6 11
100,000	10	May 31	10	Cape Town & Dis., Ltd.	17—17½	..	5 14 3
100,000	10	Apl. 28	4½	Do. 4½ p c Pref.	10¼—10⅝	..	4 3 9
50,000	50	May 2	6	Do. 6 p.c. 1st Mort.	53—55	..	5 9 1
50,000	Stk.	June 29	4½	Do. 4½ p.c. Deb. Stk.	102—104	..	4 6 7
1,400,000	Stk.	Aug. 31	5⅛	Commercial 4 p.c Stk.	117—120	+1	4 5 0
560,000	,,	,,	5	Do. 3½ p.c. do.	113—115	+1	4 6 11
450,000	,,	June 15	3	Do. 3 p.c. Deb. Stk.	87—89	..	3 7 5
800,000	Stk.	,,	6	Continental Union, Ltd.	117—120	+2	5 0 0
200,000	,,	,,	7	Do. 7 p c Pref.	137—142	..	4 18 7
424,070	Stk.	—	5½	Derby Con. Stk.	124—126	..	4 7 4
55,000	,,	June 3	4	Do. Deb. Stk.	108—110	..	3 12 9
486,090	10	July 28	11	European, Ltd.	22½—23½	..	4 13 7
354,060	10	,,	11	Do. £7 10s. paid	14½—15½	..	5 6 5
15,223,235	Stk.	Aug. 16	4⅝	Gas- } 4 p.c. Ord.	99½—100½	..	4 7 7
2,600,000	,,	,,	3½	light } 3½ p.c. max.	92—94	..	3 14 6
3,799,735	,,	,,	4	and } 4 p.c. Con. Pref.	109—112	..	3 11 5
4,193 975	,,	June 15	3	Coke } 3 p.c. Con. Deb.	88—90	..	3 6 8
258,740	Stk.	Sept. 15	5	Hastings & St. L. 3½ p.c.	98—101*	..	4 19 0
70,000	10	Apl. 28	11	Hongkong & China, Ltd.	18½—19½	..	5 12 10
3,800,000	Stk.	May 12	10	Imperial Continental	217—220	+1½	4 10 11
473,600	Stk.	Aug. 16	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,242	Stk.	Aug. 31	6	Lea Bridge Ord. 5 p.c.	125—130	..	4 12 4
561,000	Stk.	Aug. 16	10	Liverpool United A	224—226	+2	4 8 6
718,100	,,	,,	7	Do. do. B	168—170	+2½	4 2 4
306,083	Stk.	June 29	4	L'rpool Unit'd Deb. Stk.	111—113	..	3 10 10
75,000	5	,,	5	Malta & Medn., Ltd.	4¼—4⅝	..	5 5 3
560,000	100	Apl. 1	5	Met. of } 5 p.c. Deb.	102—104	..	4 16 2
250,000	100	,,	4½	Melbourne } 4½ p.c. Deb.	102—104	..	4 6 7
541,920	20	May 31	3⅜	Monte Video, Ltd.	11½—12½	..	5 12 11
1,565,892	Stk.	July 29	4⅝	Newc'tle & G'tesh'd Con.	106—107	..	4 6 5
406,025	Stk.	June 29	3½	Do. 3½ p.c. Deb.	98—100	..	3 10 0
15,000	10	Aug. 31	10	North Middlesex 10 p.c.	18½—19½	..	5 2 7
52,940	1	,,	7	Do. 7 p.c.	13—14	..	5 0 0
300,000	Stk.	May 12	8	Oriental, Ltd.	145—148	..	5 8 1
600,000	5	Sept. 14	7	Ottoman, Ltd.	6—6¼*	..	5 12 0
168,255	Stk.	—	6½	Plym'th & St'house 5 p.c.	—	..	—
398,490	5	Apl. 28	6	Primitiva Ord.	6½—6⅝	..	4 8 11
796,980	5	July 28	5	Do. 5 p.c. Pref.	5¼—5⅜	..	4 6 11
488,900	100	June 1	4	Do. 4 p.c. Deb.	97—99	..	4 0 10
851,070	10	Apl. 28	7	River Plate Ord.	13—13½	..	5 3 8
300,000	Stk.	June 29	4	Do. 4 p.c. Deb.	96—98	..	4 1 8
250,000	10	Apl. 13	7	San Paulo, Ltd.	13—13½	..	5 3 8
70,000	50	July 1	5	Do. 5 p.c. Deb.	51—53	..	4 14 4
135,000	Stk.	Mar. 15	10	Sheffield A	238—240	..	4 3 4
209,984	,,	,,	10	Do. B	238—240	..	4 3 4
523,498	,,	,,	10	Do. C	238—240	..	4 3 4
126,105	Stk.	Aug. 31	5½	Shrewsbury Ord. 5 p.c.	104—106	..	5 3 9
70,000	10	May 31	10	South African	16—17	..	5 17 8
6,250,000	Stk.	Aug. 16	5½	South Met., 4 p.c. Ord.	132—134	..	4 2 1
1,895,445	,,	July 13	3	Do. 3 p.c. Deb.	88—90	..	3 6 8
575,000	Stk.	Aug. 16	5½	S'th Suburb'n Ord. 5 p.c.	122—125	..	4 8 0
60,000	,,	,,	5	Do. 5 p.c. Pref.	125—150	..	4 4 7
112,533	,,	July 13	5	Do. 5 p.c. Deb. Stk.	130—135	..	3 14 1
502,310	Stk.	May 12	5	Southampton Ord.	111—114	..	4 7 9
87,950	,,	—	4	Do. 4 p.c. Deb.	—	..	—
120,000	Stk.	Aug. 31	6¼	Tottenham } A 5 p.c.	122—125	..	5 0 0
563,020	,,	,,	4¼	and } B 3½ p.c.	96—99	..	4 16 0
125,000	,,	June 29	4	Edmonton } 4 p.c. Deb.	105—108	..	3 14 1
182,380	10	June 15	8	Tuscan, Ltd.	9¾—10½	..	7 16 1
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	100—102	..	4 18 0
30,000	Stk.	Aug. 16	7¼	Wands- } A 5 p.c.	—	..	—
255,636	,,	,,	6¼	worth } B 3½ p.c.	137—140	..	4 9 3
60,000	,,	,,	5⅛	and } C 3½ p.c.	113—116	..	4 13 6
57,564	,,	June 29	3	Putney } 3 p.c. Deb. Stk.	82—85	..	3 10 7
745,872	,,	Aug. 16	5	West Ham 5 p.c. Ord.	103—105	..	4 15 3
185,000	,,	,,	5	Do. 5 p.c. Pref.	122—125	..	4 0 0
193,300	,,	June 29	4	Do. 4 p.c. Deb. Stk.	104—109	..	3 13 5

Prices marked * are "Ex div."

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Resists 4500° Fahr. Best for GAS-WORKS.
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WORKING Foreman Gas-Fitter wanted by a Gas Company in the Midlands. Capable of Advising Consumers in regard to Lighting, Estimating cost and Fitting up premises with latest methods. State Age, Experience, and References, with Wage. Improving position to a really capable Man.
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METER-MAKER wanted in Midlands. Accustomed to Repair Wet and Dry Gas-Meters, Prepayment Meters, and testing same.
Apply, stating Age, Wages required, with full Particulars and References, to ENGINEER, Derby Gaslight and Coke Company, Friar Gate, DERBY.

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TO BE SOLD, Gasholder, 30,000 cubic feet capacity; another 15,000 feet capacity. Both new and ready for delivery.
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ASHFORD (KENT) URBAN DISTRICT COUNCIL.

THE Lighting Committee of the above Council are prepared to receive TENDERS for the surplus TAR made during the Year commencing Nov. 1, 1905.
The probable quantity is 50,000 Gallons. Any other Particulars can be obtained on application to the undersigned.
Tenders, duly endorsed, addressed to the undersigned, to be delivered to me not later than Thursday, Oct. 5 next.
The Committee do not bind themselves to accept the highest or any Tender.

JOHN MORTON,
Manager.

Gas-Works, Ashford,
Sept. 16, 1905.

ROBERT DEMPSTER & SONS, Ltd.,
Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, Rose Mount Iron-Works, Elland.

COKE.

THE Directors of the Wandsworth and Putney Gas Company invite TENDERS for the removal of about 10,000 Tons of "Wandsworth" COKE from these works between October 1 next and March 31, 1906.

The Coke to be removed by van or by barge (free waterway on River Thames).

Sealed Tenders, endorsed "Tender for Coke," to be delivered here not later than Sept. 22 inst.

The Directors reserve to themselves the right to accept any Tender in part or in whole, and do not bind themselves to accept the highest or any Tender.

Any further information may be obtained from the Engineer, Mr. H. O. Carr.

Chas. W. Braine,
Secretary.

Wandsworth and Putney Gas Company,
North Street, Wandsworth, S.W.,
Sept. 4, 1905.

TENDERS FOR SURPLUS COKE.

THE Directors of the Isle of Thanet Gaslight and Coke Company are open to receive TENDERS for the purchase of their surplus COKE for One Year, dating October 1st, 1905, to September 30th, 1906. Estimated quantity, about 6000 Tons. Such Coke can be loaded into Carts on Works, or delivered on Rail, or into Barges at the Quay; the dues on the Coke sent by Barges will be 7½d. per ton, which charge will have to be paid by the purchaser. Such surplus not to be sold in the Isle of Thanet.

Tenders, endorsed "Surplus Coke," to be sent in on or before Thursday, Sept. 21, addressed to the Chairman of the Company.

The Directors do not bind themselves to accept the highest or any Tender.

Further Particulars can be had on application to the undersigned.

By order,
Thos. Fuller, F.C.I.S.,
Secretary.

Offices: The Dane, Margate,
Sept. 8. 1905.

BRITISH GASLIGHT COMPANY, LIMITED.

NOTICE is Hereby Given, that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at this Office on Wednesday, the 27th inst., at Twelve o'clock precisely, to transact the usual Business, to declare a Dividend for the Half Year ended the 30th of June last, to elect Two Directors in the place of those who go out by rotation, and to appoint Two Auditors.

Notice is Hereby also Given, that the TRANSFER BOOKS of the Company WILL BE CLOSED on the 16th and RE-OPENED on the 28th inst.

By order of the Court of Directors,
H. B. Chamberlain,
Secretary.

Chief Office: No. 11, George Yard,
Lombard Street, London, E.C.,
Sept. 6, 1905.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at Mr. Alfred Richards' Offices, 18, Finsbury Circus, E.C.

GAS LAMPS,
REFLECTING LANTERNS, &c.
S. SHERMAN & SON,
WEST CENTRAL GAS LANTERN WORKS
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Catalogue (Just Printed) on Application.
Telephone: 4939 Gerrard.
Telegrams: "Illuminate, London."

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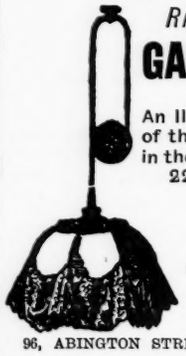
GAS PENDANT

An Illustrated Description of this Pendant appeared in the "Journal" for Nov. 22, 1904 (page 599).
Write for full Particulars to the
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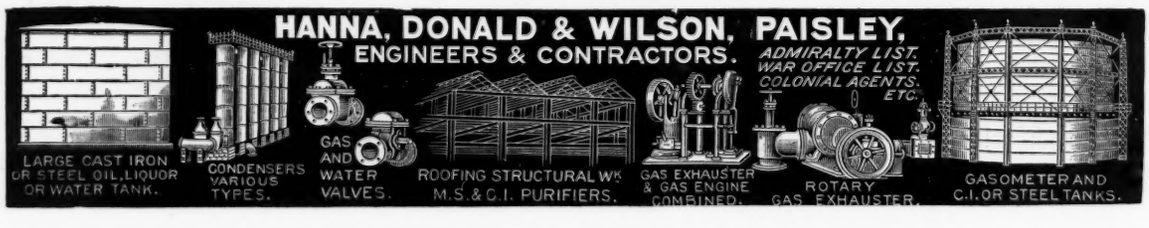
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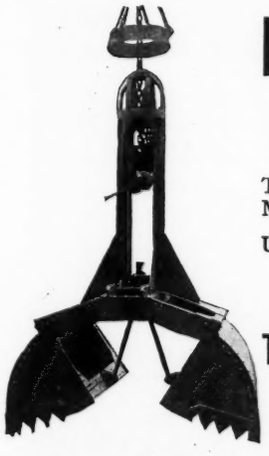

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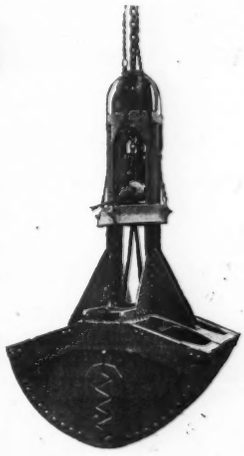

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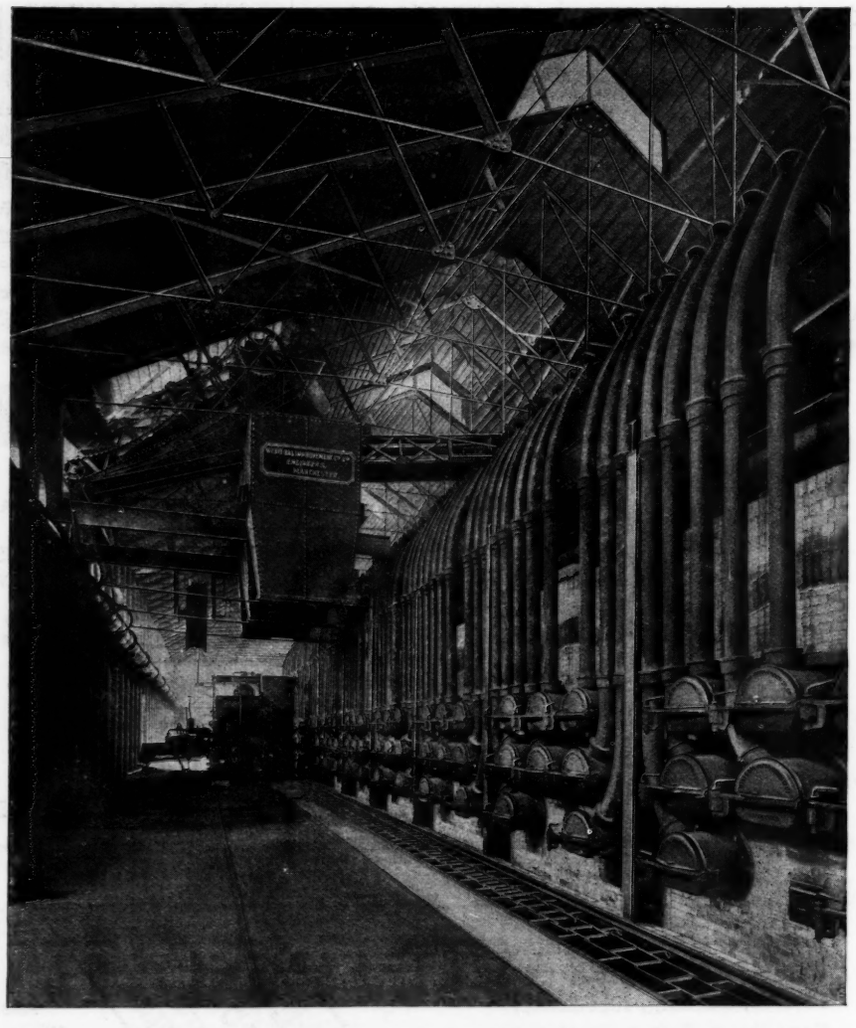
is fitted to the overhead Coal-Hoppers for gauging the depth of Coal contained in them.



With the **WEST'S COMBINED CHARGING AND DRAWING MACHINE** all classes of coal can be efficiently dealt with, and it requires only One Machine Driver and One Attendant to charge and draw the Retorts, attend to the Mouthpieces, and fill the Furnaces.

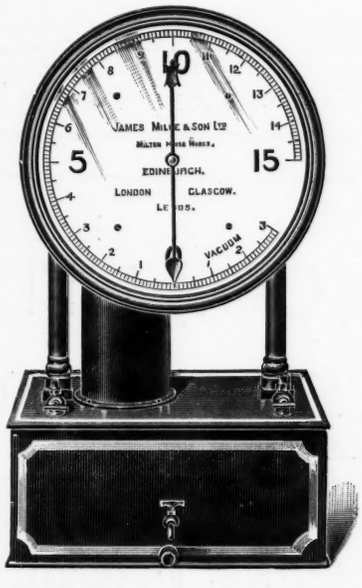
COAL AND COKE BREAKING, ELEVATING, AND STORING PLANTS.

BELTON'S PATENT AUTOMATIC RELIEF APPARATUS FOR HYDRAULIC MAINS.

Manufacturers for America: Riter-Conley Manufacturing Company, Pittsburg.

KING'S Pressure Gauge IN CAST IRON.

WITH LARGE DIALS
11½ & 16½ inch diameter.



For CLEAN or FOUL GASES.

Any Range of Pressure or Exhaust.

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LIMITED,
Milton House Works, EDINBURGH . . .
Also at LONDON, GLASGOW, and LEEDS.

Patent applied for. Registered.

GREAT NOVELTY

THE
'ROYAL' INCANDESCENT GAS-LIGHT CANDLE.

The most decorative Gas-Light ever offered.

A perfect combustion Burner.

Cannot get out of order.

60-Candle Power with 2½ cubic feet of Gas.

Can be used anywhere instead of a "C" Burner.

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MECHANICAL COAL HANDLING PLANTS
OF ANY MAGNITUDE
MADE AND ERECTED
BY
GIBBONS
BROTHERS
LTD
DUDLEY & LONDON

ARROL-FOULIS
Patent Automatic Machinery
FOR
DRAWING AND CHARGING GAS-RETORTS.

Full Particulars may be obtained from the Sole Makers,
SIR WILLIAM ARROL & CO., Limited,
GLASGOW.

[See Illustrated Advertisement, Sept. 5, p. 602.]

6 Modern Maxims 6

**"The Lighter the Shop
The Heavier the Drop—"**

Meaning: the heavier the drop of money into the Cash-box. Do not be afraid, therefore, of pushing powerful lights to the fore, though they mean a trifling outlay. But see that your client gets the most economical light. That's what he wants, and it pays you both—and us—to prefer the self-intensifying lamp of greatest merits—the Lucas Lamp.

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W. J. JENKINS & CO., LTD.,

SOLE MAKERS OF THE

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THE JENKINS

DE BROUWER DISCHARGER,

AND THE

DE BROUWER PATENT HOT COKE CONVEYOR.

MAKERS OF EVERY DESCRIPTION OF **GAS PLANT,** COAL AND COKE BREAKERS, ELEVATORS, ROOFS, STAGE FLOORS, HYDRAULIC MAINS & RETORT FITTINGS.

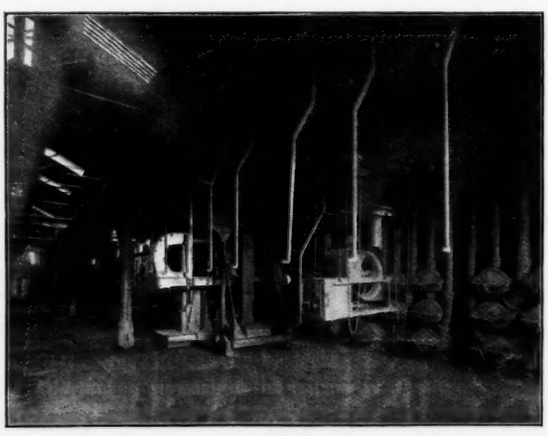

Photo showing the "D.B." Projector and Jenkins "D.B." Discharger at work in the Lancaster Gas-Works.

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WELSBACH LIGHT

(PATENTED)

Fig. 35. 100 c.p.

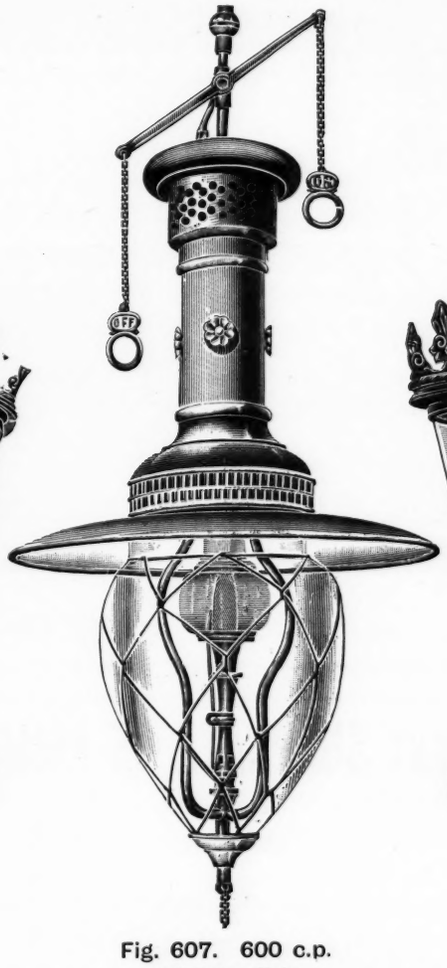

Fig. 607. 600 c.p.
Self-Intensifying.

Fig. 35a. 300 c.p.
Self-Intensifying.

WELSBACH "C," "CX," AND PLAISSETTY MANTLES,
4½d. each, subject.

Thousands of the above Lamps in use and giving satisfaction.

EACH LAMP AND MANTLE GUARANTEED.

THE

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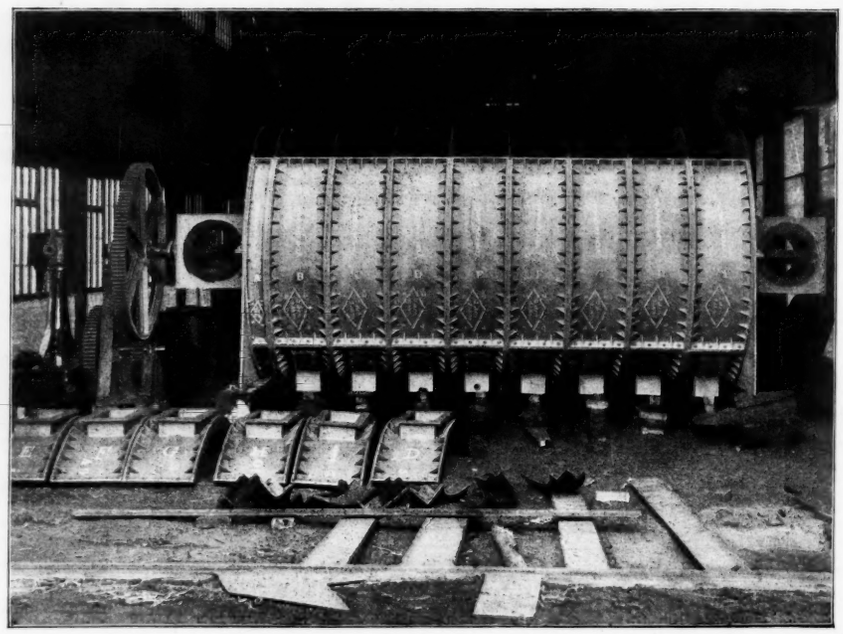
THE WHESSOE FOUNDRY CO., LTD.

Works: DARLINGTON.

LARGE AREA OF WASHING SURFACE.

REMOVAL OF THE WHOLE OF THE AMMONIA AND A LARGE PERCENTAGE OF CO_2 AND SH_2.



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BUNDLES EASILY ACCESSIBLE FOR CLEANING.

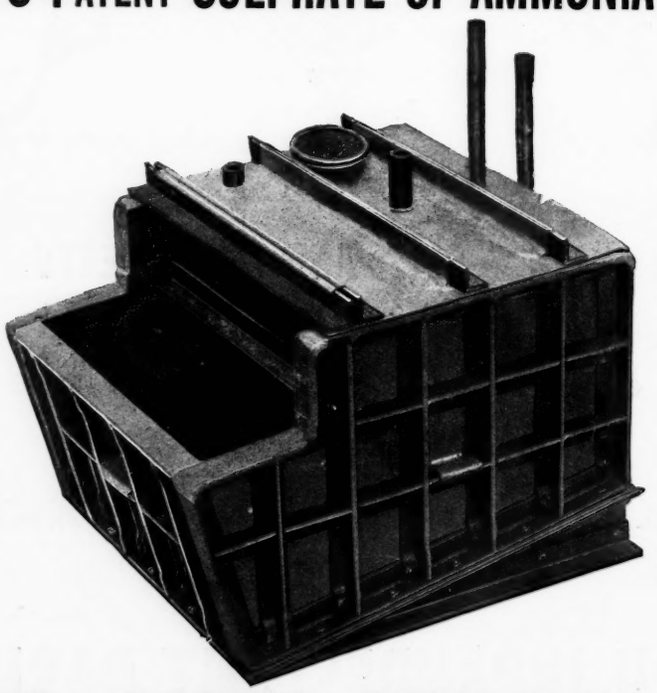
"Whessoe" Rotary Washer-Scrubber (H. Kirkham & Chandler's patent). **Capacity 1,500,000 Cub. ft. per diem.**
One of Two Machines supplied by us to a Foreign Gas-Works, photographed in our shops during course of construction.

London Office: **106, CANNON STREET, E.C.**

STANDFAST'S PATENT SULPHATE OF AMMONIA SATURATOR

ELECTRICALLY WELDED!

Prices on application.



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Wet and Dry Gas Meter Manufacturer.

PREPAYMENT METERS for Pennies, Shillings, or any other Coin.

Price, with Four Burners, **52/6** List.

FIG. I. 429.

Price, without Burners, **47/6** List.

SEASON 1905-1906.

THE NEW

SOLID COPPER DOUBLE CASE "ARC" LAMP

(COWAN'S PATENT No. 23,616)

With Patent Cock at Bottom, for Outside Lighting.

SHADOWLESS. NO FLASHLIGHTS. NO CHIMNEYS.
No Wire Gauze or Chains. No Springs or other Fragile parts used in the construction of these Lamps.

ESTIMATED ILLUMINATING POWER, 400 TO 500 CANDLES.

Any of the "C" Mantles of Commerce can be used.

WIND AND WEATHER-PROOF.

One Pilot-Light only used to light all the Burners.

The Enamelled Gas-Way, being central, is Shadowless.
Length over all 24 inches.

Can be supplied with Clear, Alabastrine, or Opal and Clear (Diagonal) Globes.

Also made with Bye-Pass Lever Cock on top.

STRONG COLD ROLLED COPPER OUTER AND INNER CASES.

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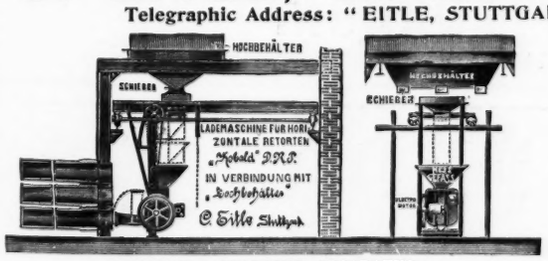
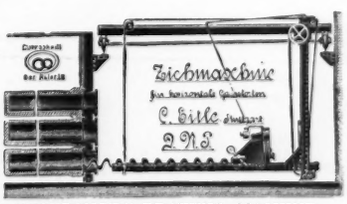


"KOBOLD" CHARGING APPARATUS.



"SCHLANGE" DRAWING MACHINE

ADVANTAGES OF THE "KOBOLD" CHARGING APPARATUS.

1.—The simplest of all existing Charging Machines, as in charging there is only ONE shaft working.
2.—Almost indestructible in construction, as there are no combustible parts exposed to the heat of the Retorts.
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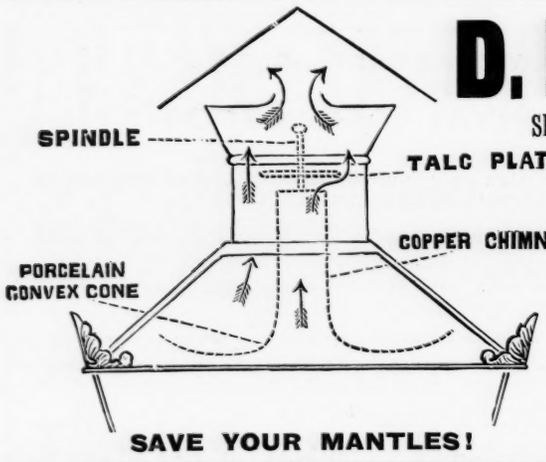
6.—Smallest consumption of power.
7.—Most rapid working, as the complete charging of a retort requires only two pulls of a lever.
8.—May be set at any position in regard to height by either manual or motor power.
9.—Lowest cost to purchase; paying interest and redemption in about three years.

ADVANTAGES OF THE "SCHLANGE" DRAWING MACHINE.

1.—The simplest and best drawing machine in the world for horizontal retorts.
2.—Least time required to draw a retort (10-15 seconds).
3.—Most careful treatment of the lumps of coke, as well as the retort.
4.—Smallest consumption of power.
5.—Lowest cost to purchase.
6.—Most substantial construction, and consequently very low maintenance charges.
7.—Rapid and cheap working, consequently pays interest and redemption in a few years.



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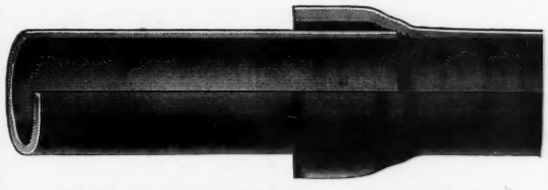

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